THE GRAND COSMIC NARRATIVE:
A CREATION STORY BY MODERN SCIENCE FOR A SECULAR AGE

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A DISSERTATION SUBMITTED TO
THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

GRADUATE PROGRAM IN HUMANITIES
YORK UNIVERSITY
TORONTO, ONTARIO

June 2026

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Abstract

This dissertation argues that the television series *Cosmos* (1980, 2014, 2020) instantiates a distinct narrative genre—the "Grand Cosmic Narrative" (GCN)—that is inadequately characterized by existing classifications in the history of science communication. Scholars have situated *Cosmos* alongside the "Epic of Evolution," which organizes scientific disciplines around evolutionary progress and normative orientation, and the "Humanist Blockbuster," which deploys spectacular visuals and awe within a framework of human exceptionalism. While *Cosmos* shares features with both, it exceeds their explanatory reach. The GCN is distinguished by its deliberate appropriation of theological motifs—love, reverence, connectedness, oneness, presence—and its deployment of affect-rich audio-visual media to produce a holistic, cohesive secular cosmogony spanning from the Big Bang to the present.

Drawing on Hans Blumenberg's ([1979] 1985) concept of "reoccupation," this dissertation argues that the GCN fills metaphysical answer positions—concerning origin, meaning, purpose, and moral orientation—that were destabilized through the secularization processes Charles Taylor traces in *A Secular Age* (2007). As theological frameworks became one option among many in the post-secular North Atlantic world, the GCN, I argue, emerged as a *functioning* secular alternative that nonetheless carries what Terence Keel (2018) identifies as a "cultural debt" to the Christian traditions it supplants. Drawing upon literature on myth, like from Mary Midgley and Hans Blumenberg, to understand myth as a foundational cultural construction occurs when its significance endures through successive retellings, this dissertation theorizes how *Cosmos* secularizes Christian Creation and biblical exegesis via science while preserving their narrative and existential functions.

This dissertation traces a genealogy of scientific grand narratives from German Romanticism and Victorian evolutionary epics through to contemporary digital media,

attending to the progressive displacement of supernatural explanation by wholly naturalistic accounts. Each chapter provides a theoretically informed close reading of two episodes from *Cosmos* and examines how their presentation bridges the object-subject divide—the world as described by physics and the *Lebenswelt* of subjective meaning—through rhetorical, aesthetic, and affective strategies that function analogously to religious experience. The dissertation contributes to the underrepresented intersection of science communication, popular culture, and science-religion dialogue by introducing a new analytical category and a theoretical framework to understand how secular narratives perform the cultural work traditionally associated with religion.

Acknowledgments

You know what they say—"life is a journey." This feels especially apt given the many setbacks and hurdles encountered in reaching the finish line of this project. Many thanks are owed to numerous people who helped me get here. Professionally, I must thank Bernard Lightman, my supervisor, who was always available, prompt, and professional, and whose expertise was invaluable for this project. There is no other Canadian scholar this project would have been fit for in the way Bernie was, and there was no better supervisor someone like me could have asked for. I am very grateful to you, Bernie. Thank you. I am also grateful to the other members of the committee, Mark and Steve. You were both thorough, kind, and supportive. Thanks also go to Tina and Joan for being part of this. I also want to thank Arthur Petersen, who travelled from the Netherlands to be part of the defence of this project. Not only are his numerous credentials and broad expertise important, but his friendship and support have been encouraging and sustaining. I am very grateful to you as well. A final thanks to Fraser Watts, whose support, kindness, friendship, and belief in me literally enabled me to continue in the doctoral programme. Your mentorship and friendship mean the world to me. Thank you. A quick thank-you is owed to Kean Birch, who invited me to York. And of course, many thanks go to York University and the staff of both STS and Humanities. Personally, I want to thank my parents, Scott, Reg, Lynn, and Gilles, for supporting this endeavour, even if they couldn't quite explain or understand what I do! And a round of thanks to my friends who supported me: Adrian, Benwha, Eastmond, Bro Joe, Austin, Kathy, Jones, Drew, David, Brit, and Justin. You have all helped, and I am grateful to you all. A final round of thanks to my partner's family, who have been so welcoming and kind: Renée, Scott, JackyBoy, Edwardio, Kenny, and Kiki. And to Dr. Jess Hall: Your support and love, intelligence and patience, kindness and compassion, have been the bedrock on which all of this was built. The world that the GCN aspires to is a world I wish for you. Thank you.

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Acronyms and Abbreviations

aLIGO = advanced Laser Interferometer Gravitational-Wave Observatory

ANT = Actor-Network Theory

APV = *A Personal Voyage*

ASO = *A Spacetime Odyssey*

CGI = Computer Generated Image

CRTC = Canadian Radio-television and Telecommunications Commission

DNA = Deoxyribonucleic Acid

HoE = Halls of Extinction

ISS = International Space Station

MOOC = Massively Online Open Course

OECD = The Organization for Economic Co-Operation and Development

PISA = Programme for International Student Assessment

TLC = The Learning Channel

For tomorrow and beyond—a better world calls.

Chapter One

"Come with Me"

The Cosmos is all that is or ever was or ever will be. Our feeblest contemplations of the Cosmos stir us – there is a tingling in the spine, a catch in the voice, a faint sensation, as if a distant memory, of falling from a height. We know we are approaching the greatest of mysteries.

– Carl Sagan, Cosmos

Introduction

I want to tell you a story. I want to tell you this story by exploring a set of themes, each presented in the following chapters of this book, building on the previous one and adding to the overall story I want to tell. At its most general level, this is, in one way, a story about stories, and in another way, it is a story about us. More specifically, this story attempts to make sense of how the values of specific narratives change over time, why (or if) they change, and toward what they change. I focus on meaning-making through an unlikely source: science. It is my goal in this work to demonstrate that this story, what I will call in this dissertation a Grand Cosmic Narrative (GCN), constitutes a distinct narrative genre, one situated at the crossroads of science and religion, whose cultural operations and conditions of emergence warrant sustained scholarly analysis.

Story has been central to the human experience for thousands of years. As long as humans have had language, we have likely had stories (Smith, Schlaepfer, and Major et al., 2017). Some of the earliest evidence of this comes from what we perceive as visual stories of hunting on the cave walls in Europe, dating to some 40,000 years ago (Aubert, Lebe, and Oktaviana 2019). These early stories, seemingly forever preserved on the rock faces of European caves, are considered early prototypes for religious expression and symbolic representation, as the stories told, preserved and shared over generations, set up the requisite information for safeguarding and enforcing culture and symbolic respect (Palacio-Pérez 2010); they may have also developed the basic tools of language and knowledge exchange by having the symbolic images physically correlated with acoustic responses of the cave (Miyagawa et al. 2018).

Today, religion, broadly conceived, is often considered one of the primary sources of cultural storytelling here in the Christian world, which I will refer to throughout this dissertation as the "North Atlantic world." This term, I borrow from Charles Taylor in his 2007 book, *A Secular Age*, which will be discussed in depth in Chapter Three titled "A Secular Age." In brief, this term details a "civilization whose principal roots lie in what used to be called 'Latin Christendom'" because "secularity, like other features of 'modernity'—political structures, democratic forms, uses of media, to cite a few other examples—find rather different expression, and develop under the pressure of different demands and aspirations in different civilizations" (Taylor 2007: 21). This points to the historically significant connection that the countries of the Western Atlantic have shared in all facets of their cultural development, broadly conceived.

While Taylor is aware that, even confining his work to the North Atlantic world, his "canvas is on the verge of being too broad", his aim is that "some light can be cast on general features" (Taylor 2007: 21). Like Taylor, I confine this work to the North Atlantic world,

specifically narrowing in on the Canadian and American context, for three reasons. First, this project's scope must be sufficiently narrowed to maintain the strength of the threads that run through it. The second is that, in my view, not every work of scholarship originating from Western-based institutions needs to address themes beyond the confines of Western traditions. It is still—and will always be—the case that scholarship is needed to address the changing tides of Western civilization. This work was done in North America, and its analysis was based on North American content.

This leads to my final and most important reason: I have striven to make this work theoretically broad and openly applicable so that the possibility of further expanding and exploring this project's thesis on a broader scale, something I am keen to do in the Global South, especially India, China, and South America, is viable. Looking at a social media platform like Instagram, for example, using the hashtag #carlsagan, returns virtually endless posts in English, Spanish, and Portuguese. Maintaining relationships with Brazilian researchers has been fruitful for understanding Carl Sagan's impact in South America, especially in Brazil, which I am eager to explore in detail. Taylor's work provides us with the tools to examine the story I wish to tell here as a new addition, a new option among the many human stories, one that may even be considered a challenger, which has risen over the last few centuries. Regarding South America, this work sets the stage for investigations that are indebted to Taylor's analytic framework.[1]

To begin this particular story, the two sources of inspiration and the source of its intrigue must be introduced. Of the world's great enterprises, few have been represented in the sphere of public and intellectual discourses in such broad, engaged, conflicted, and even mythic status as science and religion. These two enterprises are so often introduced with such

[1] Several of these terms—especially "science," "religion," and "secular"—carry contested disciplinary meanings that require clarification. I address these in the final section of this chapter, "A Note on Terms."

passionate, and occasionally contrived, historicities that their interactions are today expressed in the popular mind with hostility and discontent, citing incomplete or misrepresented examples. A simple test of this can be as easy as doing a quick Google or YouTube search, or, scandalously, the next time you are at a dinner party, ask the guests what they think about science and religion and how they interact. Such searches or discussions with friends and/or family will likely raise a critical element in the historiography of science and religion: the conflict thesis. It is difficult not to sympathize with such conflict-view holders; critical moments in the history of science have often focused on (and usually incorrectly) the ontological, psychological, and practical differences between these two enterprises, with examples such as Galileo, Newton, and Darwin standing notably and chiefly among them as examples of science and religion being misrepresented. Today, examples of science and religion in conflict also seem to play out in discourses about the overall popularity of right-wing versus left-wing politics. These moments, however dramatized and exaggerated, have caused such damage to the popular mind that, within everyday discourse perpetuated by current media, representations of science and religion frequently enforce the conflict thesis. Though, as we shall see, the picture is more complicated than this framing suggests, since certain widely consumed narratives like the Grand Cosmic Narrative operate according to a rather different logic, one that resists the neat binaries of the conflict model even as that model retains its popular appeal.

Originating in the late nineteenth century in the works of John William Draper and Andrew Dickson White, the conflict thesis is a ‘whiggish’ historicity that Draper and White, two liberal-minded, scientifically trained academics, developed. The fact that White helped found, and later was president of, Cornell University, America’s first private, non-sectarian university, should illuminate some of the social and intellectual attitudes in place during the writing process. Their works, *History of the Conflict Between Religion and Science* (1874)

and, *A History of the Warfare of Science with Theology in Christendom* (1896), respectively, have received much attention from a wide diversity of scholarship, from historians of science and theologians, to anthropologists and sociologists (Dawes 2008 & 2016; Ecklund 2010; Ferngren 2002; Numbers 2009; Schaefer 2015; Aechtner 2015; Ungureanu 2019). The conflict thesis remains a powerful though not unchallenged current in popular discourse on science and religion today, holding that science and religion are fundamentally opposed. It is worth noting at the outset that the conflict thesis coexists, somewhat paradoxically, with narratives that complicate or even subvert it, which goes some way towards explaining the prolonged and unsuccessful attempts by academics over the past decades to extinguish the conflict thesis. The Grand Cosmic Narrative, as I will argue, is such a complication, though its cultural pervasiveness has not, on its own, displaced the conflict framework from the popular imagination.

These answers, the root of this apparent conflict, are the source of most metaphysical questions confronting conscious, language-bearing beings—where do we come from? Was there a beginning for Earth? For us? Is there a God? These questions were once the domain of myths and religions, but, beginning in the early modern period and expanding exponentially in the modern period, they were disrupted and challenged by the findings of natural historians, natural philosophers, and later scientists. Such metaphysical questions are what I will refer to as "answer positions". I adopt this term from Hans Blumenberg (1920-1996), a German philosopher of metaphor and an intellectual historian concerned with myth and cultural structure. For Blumenberg, the answer positions to the deep, sometimes troubling questions, like those I raised above, are never static but dynamic, changing depending on the context of the time and place of their asking.

That answer positions do indeed change becomes a source of tension between those who hold previous answer positions and those who adopt new answer positions. Ian Barbour

(1923-2013), the former Winifred and Atherton Bean Professor Emeritus of Science, Technology and Society at Carleton College, argued that these places of tension ultimately become the focus of public engagements on the answers from science and religion as worldviews and social institutions collide (Barbour 1997). Since Draper and White's publications, the intersection between science and religion has only grown more complex, as academics, religious leaders, politicians, science popularizers, and the public generally have used the enthusiasm this heated topic generates for both noble and ill purposes.

The extremes to which human beings will go to ensure their social environments and power relations remain stable, regardless of the consequences, have contributed to the present social and psychological pressures that both the individual and society face regarding these two enterprises, science and religion. Both have been critical in offering two unique interpretations of human understanding of time and space, nature, reality, morality (or lack thereof), ethics, purpose, meaning, cultural and social practices, and the vast range of engagements and practices humans undertake. That the Christian religion has existed for so long and has influenced so much of history and its people is no doubt a significant contributing factor in the most common tensions that exist; the power religion holds in providing a stable worldview is of paramount importance to understanding not only the longevity of religion but also the tension between the worldviews offered by religion and science. The survivability of the social human being seems to demand relatively stable patterns of cultural, social, and economic practices, as revolutionary changes either cause or trigger long-term collective trauma. This motivates this dissertation, for I claim a new cosmogony, provided by the scientific method, has emerged to combat these degrading processes. While its modern televisual form spans scarcely half a century, its deeper intellectual roots—stretching back through Humboldt's Kosmos (1845) and beyond—remind us that the impulse to narrate the universe as a coherent, awe-inspiring whole is considerably

older than what is taken for granted. I claim that this emergence reveals much about the perceived tensions in everyday discourse between science and religion.

Today, the complete worldview that science can offer, when synthesized into a relatively cohesive narrative, is functionally analogous and structurally comparable to the myriad cosmogenic myths that have existed across the world, held by the world's many cultures, and told for thousands of years, though caution is warranted about pressing the analogy too far, since the epistemological foundations, truth-claims, and modes of authority at work in the GCN differ fundamentally from those traditional cosmogenic myths. New works have emerged in the last two decades that have proclaimed science as a myth for modernity, occupying the same metaphysical and ontological status of myths of ages past (Christian 2005, Druyan 2020, Midgley 1992 & 2004, Sagan 1980 & 1994, Swimme and Tucker 2011, White 2018, Zakariya 2017). Looking at the major titled historic eras of modern North Atlantic history, the most impactful, in terms of longevity and importance, have resulted from contestations between opposing worldviews; examples include the Renaissance, the Enlightenment, the French Revolution, and the Industrial Revolution. They *have* 'names' and *are* studied because of the struggles between the various social, cultural, institutional, philosophical, political, and psychological forces and their opposing and converging worldviews. It seems then that the opposition between the two enterprises of science and religion, enduring in its present form, more or less, for about two hundred years, is another chapter in the intellectual history of competition between different worldviews, which is commonly represented in popular discourse as the conflict thesis (Harrison 2015).

However, the conflict thesis has been extensively challenged and, in the view of most historians of science, found wanting. As John Hedley Brooke, Ronald Numbers, and Peter Harrison have each demonstrated, the historical relationship between science and religion is far too varied and context-dependent to be captured by any single model of inherent

opposition (Brooke 1991; Numbers 2009; Harrison 2015). This fallacy has persisted because science and religion are such critical pillars of the human story. Both have, in their respective ways, contributed much to human survivability and success. So why is it then that today, in everyday discourse—whether among friends, family, colleagues at work, in public discourse, etc.—science and religion occupy a spot of such tension, often with hostilities being raised? It's a truism not to speak of religion at the dinner table, but it seems increasingly common, at least since 2012, not to talk of science either. The media ecology within which the conflict thesis circulates has itself been transformed in recent years, and this transformation has implications for how narratives—including both the conflict thesis and its alternatives—reach and shape public consciousness. The year just identified is important here as it is marked by Social Psychologist Jonathan Haidt, the Thomas Cooley Professor of Ethical Leadership at the New York University Stern School of Business, as the beginning of a troubling and drastic rise in poor mental health. He attributes this rise to the rapid adoption of social media and the uptake of smartphones, which, according to his nearly ten years of data collection, are directly linked to isolated worldviews, perspectives, and thoughts (Haidt 2024).

This points to another critical aspect of this discussion, one that I will touch on throughout but cannot explore in full, given the scope of this dissertation: the political influence on these two enterprises. At the time of this writing in 2025, a form of anti-intellectualism has begun to creep into North American politics, rendering science, the university, and their outputs highly contentious; this appeared to reach full bloom during the COVID-19 pandemic (Merkley and Loewen 2021). This hostility is a clear example of how the dramatizations and exaggerations of history and story impact the popular mind, reinforcing itself through orality and perpetuating such disinformation. These hostilities are mythologized, retold in a way that fuels the flame of science-versus-religion as two competing, irreconcilable paradigms.

The mythologizing of the history of science and religion has led to contests between the two, which have become mainstream events, centres of heated debate and 'viral' media sensationalism. An example of such heated contests would be the February 4th, 2014, debate between Ken Ham—an Australian-American fundamentalist Christian young-Earth Creationist living in Kentucky, USA—and Bill Nye—an engineer and popular science educator known for his show *Bill Nye the Science Guy* (1993-1999). This debate, held at the Creation Museum that Ham helped create and streamed live on YouTube, was widely discussed throughout North America. Tickets to the event sold out within minutes of going on sale, and an estimated 3 million people watched the livestream (Weisberger 2014). With over eleven million views on YouTube at the time of this writing, this is a powerful example of the debate between (in this case, fundamentalist) Christian ideals (such as the literal interpretation of Biblical accounts of life's origin and the age and creation of the Earth) and science, apparently striking many people as a relevant, fascinating, and polarizing intersection of worldviews. It is worth pausing to note the difference in scale here. The Ham–Nye debate, a paradigmatic and dramatic enactment of the conflict thesis, has garnered some eleven million views, while *Cosmos* has been viewed over a billion times. This asymmetry might seem to undercut the claim that conflict dominates the popular imagination, but such an inference would be too hasty. Viewership figures measure exposure, not persuasion, and the conflict thesis draws its resilience not primarily from any single media event but from a diffuse ecosystem of institutional, political, and cultural reinforcements that no single counter-narrative, however widely viewed, can readily dismantle.

This one example is part of the larger, fascinating, tightly woven tapestry that is science and religion, displaying many different threads and patterns. Central to both its beauty and ugliness are the changes in the epistemic cultures that both have experienced throughout their histories. Science and religion no doubt have unique answer positions that,

for better or worse, end up as competing paradigms of knowledge. For millennia, religion and later science, though obviously of a different form and style than they are now, have been, or have become, the predominant institutions within the contemporary North Atlantic world. For example, 53.3% of Canadians, or 19.3 million people, identified as Christian in the 2021 Census (StatCAN 2022), down from 67.3% in the 2011 Census (StatCAN 2013).

In contrast, science has been—and continues to be—a key strategy in provincial Departments of Education and in federal policy alike. In 1989, the Canadian government commissioned Dr. E. Einsiedel of the University of Calgary to determine the Canadian population's basic scientific knowledge and attitudes toward science (Fawcett 1991). Half of the respondents did not know that the Earth takes a year to orbit the sun and believed that boiling radioactive milk made it safe to drink (Fawcett 1991). However, by 2003, Canadian science literacy had improved dramatically. That same year, Canada participated in its first PISA (Programme for International Student Assessment) study, hosted by the OECD (Organization for Economic Co-operation and Development), which regularly conducts international surveys on science literacy among youth from 72 countries (OECD 2003). In each successive PISA study since 2003, Canadians have ranked above average in science and mathematical literacy. Science education within the Canadian classroom has, at least in the past, contributed to a scientifically literate Canadian public.[2]

Taken together, the Canadian public's religious affiliation and science literacy indicate the importance of these two enterprises broadly in the Canadian context. Whether in personal, private practice, public policy-making, or any other context, science and religion are not only worldviews (or possible worldviews) but also necessary aspects of daily life,

[2] Unfortunately, Canada has been declining steadily since about 2012, which matches the date of Haidt's statistics on social media. This worrying trend has continued, plummeting post-COVID, and doesn't seem to be slowing down. However, Canada still rates above the average for OECD countries (OECD 2022).

whether in the holidays they embrace or the technologies they use. Yet, given all that science has achieved within the last few centuries and the outputs that it has allowed for, there doesn't appear to be any advantage that one has over the other, such as increasing scientific literacy translating into a proportional reduction in religious participation and belief, or conversely, the reassertion of religious authority translating into a retreat from scientific literacy, as so many natural philosophers, scientists, and social scientists of the nineteenth and twentieth centuries believed was inevitable in one direction or the other. I refer here to the secularization thesis, an idea emerging in the 19th century and first formulated systematically by Peter Berger in *The Sacred Canopy: Elements of a Sociological Theory of Religion* (1967). Berger's work inspired a host of scholarship from which much of secularization's early academic work originated. While the original thesis has been substantially revised over the intervening decades, the paradigm has continued to be defended and reformulated rather than abandoned completely (Bruce 2017; Watts and Wilkins-Laflamme 2026). We will explore this in more detail in Chapter Three. My concern, however, lies in the relationship between science and religion, examining objects of social and cultural significance—specifically the role of science and religion in popular culture and the narratives they produce, intentionally or not.

Since the nineteenth century, fictional and cinematic depictions of science and religion have broadly and recurrently cast these two enterprises as deeply intertwined yet often in tension, a trope famously illustrated by Mary Shelley's *Frankenstein* (1818). Early film adaptations adopted themes of hubris and moral transgression, reflecting social anxieties about "playing God" (Turney 1998). In the first half of the twentieth century, Hollywood producers faced pressure from religious organizations, notably groups like the Catholic Legion of Decency, to ensure that script portrayals of scientific theories or technological advances did not undermine core faith-based values (Kirby & Chambers 2018). Historians

have documented how these censorship and approval processes shaped the narratives of science made available to the public, whether by softening evolutionary themes or affirming divine providence in science-focused storylines (Kirby 2011).

By the 1960s, liberalized censorship rules and shifts in social attitudes allowed film and television to present more nuanced engagements with science and faith, reflecting broader cultural conversations around technological progress and existential questions (Gilbert 1997). In science fiction, works such as Carl Sagan's *Contact* (1985) explicitly juxtaposed empirical inquiry with spiritual experience, illustrating how these narrative forms may serve as modern myths that reconcile, rather than purely oppose, scientific discovery and religious belief (Lyden 2003; McGrath 2011). At the same time, scholarly analyses of apocalyptic cinema observed that disasters once ascribed to divine wrath were increasingly supplanted by technological or environmental threats, thereby repackaging, rather than eradicating, eschatological motifs (Ostwalt 1998; Kirby 2011). These mid- to late-twentieth-century developments signalled a growing public fascination with reconciling, or at least juxtaposing, scientific explanations and religious worldviews in popular media.

Research on science and religion in popular culture has yet to coalesce into a distinct, interdisciplinary subfield in the twenty-first century. Instead, it is a growing trend that draws on experts from various fields, including the history of science, media studies, theology, and communication theory. Contemporary scholarship has emphasized that seemingly "conflict-driven" narratives can also feature reflective dialogues, with cinematic storytelling often exploring how religious ethics intersect with technological possibilities or scientific evidence (Kirby & Chambers 2018). James F McGrath, for example, in his 2011 edited collection titled *Religion and Science Fiction,* brings together scholars from a variety of fields to demonstrate that religion and science fiction share overlapping concerns about humanity's place in the universe, the nature of good and evil, and the ultimate frontiers of knowledge.

Although traditionally treated as separate, the contributors argue that science fiction's futuristic or extraterrestrial settings often function as modern myths, grappling with ethical, spiritual, and cosmological questions in ways that mirror religious inquiry. In *Evolution on British Television and Radio: Transmissions and Transmutations* (2021), Alexander Hall demonstrates how British media shaped public understanding of evolutionary science, often navigating overlaps and tensions with religious beliefs. Drawing on archival sources and broadcast records, Hall shows how producers, presenters, and audiences negotiated Darwinian ideas within a cultural context where science and faith were continually debated and reconciled.

An example of early, sustained work on science, religion, and popular culture is James Gilbert's 1997 book *Redeeming Culture: American Religion in an Age of Science,* in which he argues that the dialogue between science and religion is a key force shaping contemporary American culture. This process occurs within academic settings and across various forms of popular media. According to Gilbert, this interplay actively contributes to the formation of new cultural structures as social, scientific, and technological developments demand a recalibration of traditional values. More recently, Alexander Hall and Will Mason-Wilkes' edited book *Most Adaptable to Change: Evolution and Religion in Global Popular Media* (2024) examines how popular media around the world have depicted evolutionary science and its intersection with various religious traditions. Through case studies spanning continents and covering topics ranging from fascist Spain to sub-Saharan Africa, their volume illustrates how the "conflict framing" between science and religion often persists—yet in diverse, context-specific ways.

Hall and Mason-Wilkes are chiefly concerned with how evolutionary theory and its entailments are mobilized and deployed across examples worldwide for sociopolitical ends. Their work is a critical contribution in a relatively sparse field for being "the first collection

of its kind to explicitly explore the role of popular media formats themselves as mediators in institutional debates on the relationship between evolution and religion" (Hall and Mason-Wilkes 2024: 4). This shows—and what I hope to demonstrate throughout this dissertation—that media formats and their mediating capacities as texts of information relay are of chief importance to the public at large. Throughout their book, the chapters make clear that religious authority often served as the conductor of politicians and religious and spiritual leaders in framing evolutionary science and its proponents, representing a history of both good and ill relations. As part of a global work funded by a large Templeton grant, this book's scope is sufficiently broad to demonstrate the power of media, in whatever format, over public perceptions of science-religion dialogues, with lasting consequences that permeate the public psychosocial zeitgeist.

One of the aims of this dissertation is to contribute to this small but growing area of science and religion studies by demonstrating the value of studying popular culture for the field and helping legitimize its place as an area worthy of more sustained and vigorous scholarly attention. Science and religion studies is missing some of the most crucial elements of its discussion by seeing popular culture as not quite a serious topic for scholarship (Hall and Mason-Wilkes 2024: 16). The fact is that, amongst the general population, it is becoming increasingly the case that most people in the developed world are gathering their information not from analogue, traditional sources such as books, newspapers, radio, etc., but from social media (Westerman et al. 2014) or film (Cucca 2011), forming their opinions and not seeking any information beyond what is absorbed from these media. Knowledge production and dissemination have become ever more democratized—no longer solely the domain of the academic elite—though this democratization brings with it both opportunities and challenges, not least the risk that the erosion of institutional gatekeeping may leave popular audiences more, rather than less, susceptible to simplistic framings like the conflict thesis. The

disconnect between knowledge and intuition, highlighted by scholarly insistence on straddling this line, refocuses attention from matters of fact to issues of interest, and the media is of interest, which can lead to the spread of mis- and disinformation, as well as well-intentioned, honourable, but misplaced critiques. Social media platforms, like X (formerly Twitter), Facebook, and even YouTube, are notorious for this. In 2021, the average American spent 485 minutes per day using digital media services such as social media platforms, web-based video content (streaming apps and YouTube), podcasts, and audiobooks. This should raise eyebrows at the profound impact of media texts on the general public's knowledge base and attitudes (Guttmann 2023).

This sustains my motivation for this project, as a text of popular culture can have a profound impact. The name Carl Sagan has now entered the public lexicon, appearing in modern television, discussions, and films. On 21 March 2026, for example, Elon Musk announced the Terafab project, and when explaining the rationale for energy production in space he was particularly focused on the scale of the sun and invoked Carl Sagan to give these dimensions significance (25:53).[3] I give this example not as an endorsement of Musk's broader programme—which remains deeply contested politically and ethically—but rather to illustrate the degree to which a scientifically-inflected cosmic imaginary has penetrated the discourse of technological ambition in the twenty-first century. The example is recent, and its long-term significance remains to be seen, but it speaks to the cultural currency of the narrative sensibility that Sagan helped to inaugurate. The importance of popular media in shaping opinions, ideas, and knowledge about the world cannot be overstated, and my goal in the project is to reveal to you how Carl Sagan's *Cosmos* and the spiritual reboot that followed 34 years later exemplify this mediation between the world and meaning.

[3] The livestream was broadcast on X, and can be viewed here: https://x.com/SpaceX/status/2035519125284380672?s=20

The religious and theological qualities of *Cosmos*, part of the very fabric that made it a critical and commercial success and elevated Carl Sagan's name from the realm of the learned community to the household, are essential to understand. This is not just because *Cosmos* won a Peabody award in 1980 and was nominated for five, and won three Emmy awards in 1981, but also because, since its release, it has been watched in over sixty countries and viewed well over one billion times (Shermer 2007), and this doesn't even take into account the two most recent series! Sagan's cultural ubiquity, however, should not be mistaken for evidence that his more nuanced vision of the science–religion relationship has displaced the conflict thesis in the popular mind. One can recognize a name—can quote the *Pale Blue Dot* or "billions and billions"—without having absorbed the deeper epistemological commitments that animate the Grand Cosmic Narrative. Recognition and influence, as the sociological data remind us, are not the same thing.

However, for an increasing number of people—as evidenced by the well-documented decrease in religious affiliation across the North Atlantic world, a trend driven by a complex web of social, political, and generational factors that far exceed any single media influence—the viewership of *Cosmos* does indeed touch on something that traditional faith-based practices do not. As social, political, and environmental crises weigh on the public mind, especially amongst younger people, *Cosmos* remains incredibly popular and revered. Yet we must be careful not to conflate cultural recognition with worldview displacement. That a billion viewers have encountered *Cosmos* does not mean that a billion minds have been freed from the conflict thesis—cultural saturation and ideological persuasion are, as we shall see, rather different phenomena. The GCN's reach tells us something important about the appetite for scientifically-inflected wonder, but it does not, by itself, explain why the conflict thesis remains so stubbornly lodged in public consciousness. One task of this work is to shed some light on why this is the case.

The story of science and religion, and of their respective enterprises' total ontological and epistemological products, has contributed to *Cosmos's* new narrative form. The GCN claims for itself a scope more expansive than any prior science-based narrative form, spanning from the Big Bang to the present and encompassing multiple scientific and humanistic disciplines; it is about more than science, but a view towards a world-ethic encompassing all of life and matter and how to live within the Cosmos. I have adopted the Grand Cosmic Narrative from two sources. The first is from the earliest recorded use of "grand cosmic narrative", which appeared in a review by John F Haught, a Catholic theologian at Georgetown University, quoted by Raymond L. Neubauer in *Evolution and the Emergent Self* (2011). Haught writes, "His artful and scientifically rigorous rendition of the cosmic story cunningly reveals to readers how their own personal existence and aspirations are stitched seamlessly into a grand cosmic narrative." Haught has wrestled with this term ever since. While not using this term directly, he captures its essence in a critique of the field of 'Big History', especially books like David Christian's, the founder of Big History, *Maps of Time: An Introduction to Big History* (2004), Eric Chaisson's *Epic of Evolution* (2006), and Cynthia Stokes Brown's *Big History: From the Big Bang to the Present* (2007), from the perspective of a Catholic theologian. Since Haught's first use, the term has been used occasionally but has never been classified as anything other than an intuitive notion.

The other source of the GCN title is Carl Sagan himself, who wrote the primary source material for this project. Sagan, whom I will introduce and explore more closely in the following section of this chapter, "Carl Sagan and *Cosmos*", wrote many books on popularizing science and communicating science. In his 1973 book, *The Cosmic Connection: An Extraterrestrial Perspective,* Sagan introduces the public to a 'cosmic connection' that occupies Part 1 of the book, guiding readers to observe the Earth and life from the perspective of an observer from another world. In his most important work, the television

programme *Cosmos,* he raises the idea of a ‘cosmic perspective’ throughout, an idea that is also repeated in both of the new series. It is a position to teach and to humble. In creating a relatively seamless story of science, life, and the Cosmos, one that gives those topics and our place in the universe meaning by secular means, Sagan crafted a unique narrative that I will detail in this work. I adapt Sagan’s meaning of the ‘cosmic perspective’, and the name Haught gave to this view, to provide a name and definition for this new narrative form—the Grand Cosmic Narrative—to emphasize the story’s structure, orientation, worldview, and moral, ethical, and prophetic tones.

This dissertation will provide a detailed analysis of this narrative type, examining its structural features, historical genealogy, and cultural operations, for it is a story of equal parts wonder and complexity. It is a story with a history and evolution, a culture and philosophy, and I aim to illuminate its development and suggest reasons for its growing appeal. I will argue that the GCN represents a distinct narrative genre that cannot be adequately captured by existing classifications such as the “Epic of Evolution” or the “Humanist Blockbuster,” and that its cultural significance warrants a dedicated analytical framework. One example stands out as central to this story’s shape and has received relatively little sustained academic attention despite its popularity and significance. This example is often packed into existing grand narratives of science, but I will demonstrate how it is insufficient to do so. This example is Carl Sagan’s *Cosmos*, a text that I claim is situated at the crossroads of science and religion.

Carl Sagan and *Cosmos*

To tell this story, I must start with the text central to my project, Carl Sagan’s *Cosmos* series. But to understand *Cosmos* and its story, we must explore the context of its development. As

such, I will first introduce Sagan and Ann Druyan, Sagan's collaborator and wife, as well as some details about the development and the programme itself. I will then move backwards in time, connecting dots that uncover the pathway to *Cosmos*, the historical precedent that alludes to or reflects the concepts at play in this work. A few texts directly relate to Sagan's life, while others mention his name and work. Three biographies—by Keay Davidson (2000), William Poundstone (1999), and Ray Spangenburg and Diane Moser (2004)—provide a reasonably rich portrait of the man.

On October 1st, 1980, Carl Sagan (1934-1996), the late astronomer who held the David Duncan Professorship of Astronomy and Space Sciences and directed the Laboratory for Planetary Studies at Cornell University, appeared on television screens across America in the first episode of *Cosmos: A Personal Voyage*. But to get to *Cosmos*, Sagan had to meet his third and final wife, Ann Druyan (1949-), whom he met on the Voyager Special Projects Committee at NASA to create the now famous "Golden Record," where the two fell in love and began a life together of science communication, popularization, and advocacy. *Cosmos* was their declaration of love for each other, for science, and for the hope of the world's future.

Born in 1934 and raised in Brooklyn, Sagan was exceedingly curious and bright from a young age, with an interest in a diverse range of topics. Coming from a Jewish family, Sagan grew up in what he would call a Reform Jewish family, but which his sister, Cari Sagan, would call a Conservative Jewish family (Davidson 1999: 11-12). Sagan's mother, Rachel, a woman of "razor-sharp wit" (Poundstone 1999: 5), was a practicing Jew, while his father, Samuel, was not. Regardless, it was a home of much love, kindness, and relative openness; it was a family that "created opportunities to nurture Carl's mind" (Poundstone 1999: 7). Sagan often points to his parents as knowing little of science but having both

skepticism and wonder, two crucial aspects of his later career in science popularization that would play heavily in his most famous work (Spangenburg and Moser 2004: 3-4).

Attending the University of Chicago for a double major at the age of 16 (one of the few universities that accepted undergraduates at that age) in science (physical chemistry on the origins of life) and liberal arts (humanities, especially literature and philosophy), Sagan also completed both his Master of Science and Ph.D. at the University of Chicago in astronomy and astrophysics by 1960. Sagan held a two-year postdoctoral position in biology at the University of California, Berkeley, and Stanford University before becoming an Assistant Professor at Harvard University. While appearing successful at Harvard, he was concurrently being courted by Cornell. When he was denied tenure for unclear reasons—possibly for his increasing public appearances, his popular writing, and even his writing style—he accepted a full Professor offer at Cornell immediately following Harvard's denial.[4]

Sagan's three marriages are well documented. His first wife was evolutionary biologist Lynn Margulis (1938-2011), who is well known for her work on symbiosis and for co-creating the *Gaia hypothesis* with James Lovelock (1919-2022). Sagan and Margulis had two children, Jeremy and Dorion, and remained good friends, writing to each other throughout Sagan's life. In fact, Margulis was present for the vote on Sagan's admittance to the National Academy of Sciences and wrote to Sagan about what she perceived as jealousy among the membership (Giberson and Artigas 2007: 125). Sagan then married Linda Salzman in 1968 before heading to Cornell. An artist and later screenwriter, Salzman was involved in the Pioneer Plaque for Pioneer 10 and 11 as an artistic consultant, which was adopted for the Golden Record for NASA's Voyager programme, in which Salzman played a central role in the recording of greetings in over 55 languages included in the Golden Record (Sagan 1978). Salzman and Sagan had one child, Nick, but the marriage ended in 1977 after

[4] Denial for unclear reasons was repeated with his nomination to the National Academy of Sciences.

Sagan and Druyan fell in love working so closely together on the Voyager project. Sagan and Salzman divorced in 1981.

When Sagan and Druyan met, she was an aspiring writer from a small Jewish family in New York City. Her politics, love of writing, and profound optimism for Earth influenced Sagan and their subsequent works together. Druyan and Sagan had two children together, Sasha and Samuel. Sagan learned much from Druyan, and Druyan from Sagan, but all of Sagan's children from the previous marriages agree that Druyan made Sagan a better father and a better man with a deeper understanding of the importance of people in his thinking (Davidson 1999: 317). Her impact on Sagan, though, extended far beyond family life. Their potent mix of love and optimism helped further nourish the seeds of *Cosmos*.

Druyan's influence on Sagan led them to share the belief that the American public was far more intelligent than television producers realized. With Druyan's compassionate concern for the people of America and in the backdrop of the Cold War, they both noticed that the public hungered for science to be made accessible, but presented in a way that inspired questions and gave purpose to the scientific endeavour and the human experience. They knew that utilizing the latest advances in video production, as the most recent Hollywood blockbusters had done, could aid and enhance education by showing strange new worlds and matters too complicated for analog description alone. Films that defined emerging trends of big budgets, big scores, and impressive effects, like *2001: A Space Odyssey* (1968) and the more recent *Star Wars* (1977), were so influential that they would influence *Cosmos*.

Sagan and Druyan found a supporting partner in the PBS branch of KCET, which had contacted Sagan as early as 1976, hoping that, due to his increasingly popular appeal, bolstered by appearances on *The Tonight Show Starring Johnny Carson* (1962-1992), Sagan would agree to pitch a science popularization programme (Giberson and Artigas 2007: 135). When Sagan and Druyan returned and pitched their idea just over a year later, they were

greeted with enthusiasm and substantial support of 8.2 million US dollars—a massive figure for television programming at the time—making it the most extensive and most expensive documentary of the time. The budget included planning to film across continents for on-location scenes and to utilize the latest video effects and audio composition technologies and techniques from Hollywood.

Sagan and Druyan's vision for *Cosmos* was relatively new for American television, as grand science productions had only begun appearing in the late 20th century, mainly from the BBC in the United Kingdom (Hall 2021). Interestingly, *Cosmos*' production was in the hands of veterans of science documentary production, as several BBC producers and technical staff had recently immigrated to the United States. Many of *Cosmos'* production team, notably Executive Producer and Director of *Cosmos*, Adrian Malone, had worked on a previous ground-breaking BBC production called *The Ascent of Man*, developed by Sir David Attenborough and presented by Jacob Bronowski (1973) (Hall 2019, Hall 2020).

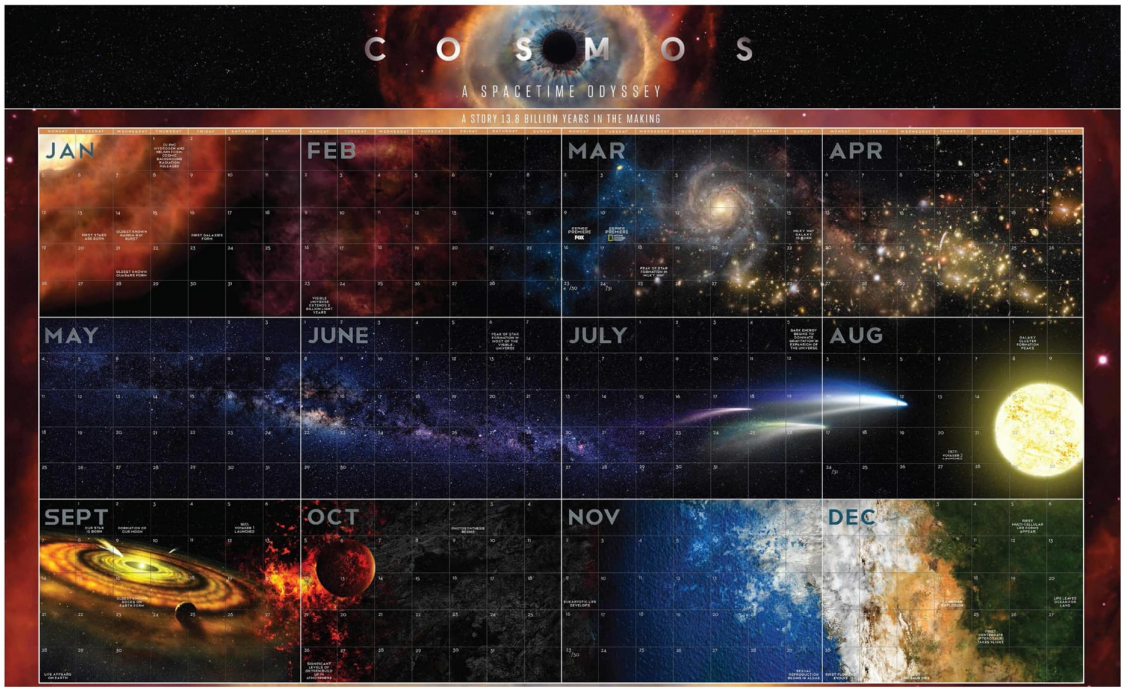
The team's experience, along with the attention to detail, attunement to the sociopolitical climate, and the desires and leadership of Sagan and Druyan for the production, was part of the reason for the incredible budget, as the visuals, audio, and narrative had to work on a scale not before seen. Adopting the 13.8-billion-year history of the known universe and everything in it was no small feat. Sagan, Druyan, and Steven Soter (1943-), an astrophysicist whom Sagan had brought on after working as Sagan's Assistant Editor for the *International Journal of Solar System Studies*, worked tirelessly to make science understandable without sacrificing its critical aspects. Most important, however, was Druyan's influence on Sagan's view of science, creating a story that would share the joy of life, the mystery and wonder of science's discoveries, and a hope for a better future. Sagan and Druyan became so invested in the development of *Cosmos* that they both moved to

California to work on the project full-time, leaving Ithaca, NY, and Cornell for over two years.

While the production of *Cosmos* was set to use new techniques from Hollywood, its writing combined elements of Druyan and Sagan's vision with tried-and-true methods of the past; just as some of the most influential works by the most important natural philosophers and scientists had done, metaphor was a tool adopted to bring the Cosmos to human comprehensibility. As Darwin had done for natural selection, Sagan, Druyan and Soter developed exegetical metaphors to demonstrate complex topics and intricate concepts (Walsh 2013: 145). With digital production techniques, these metaphors were transformed into recognizable and memorable scenes, some of which would become staples of the series.

For example, to help make sense of the incomprehensible immensity of time, Sagan introduces viewers to the "Cosmic Calendar," which compresses the 13.8 billion years the known Universe has existed into a single calendar year. A month is approximately one billion years, and a day is almost thirty-eight million years. While it is still challenging to convey the astounding span of time that has elapsed since the beginning so that the person understands it clearly, it is by far the best method used to date in any science popularization/communication programme—it helps make something inconceivably massive manageable.

Visualizing the Cosmos very humanly—a calendric year—gave Sagan the tools and methods to deliver something truly awesome and utterly humbling. In *Cosmos*, the whole history of the Earth, our solar system, and life occupies only the last four months—the autumn of the Cosmic Year. Requiring even greater humility, our lineage, the genus *Homo*, occupies only the last hour of the last day of the Cosmic Year. And to put humanity in our place: recorded history, with all our technology, civilization, history, religions, economics, politics, hopes and fears, leaders and destroyers, occurs only within the last fourteen seconds, at 11:59:46pm on Dec 31st, of the Cosmic Year.



The Cosmic Calendar from the 2013 version of *Cosmos*. Source: National Geographic

Sagan's use of the Cosmic Calendar is reflective of one of the core messages of *Cosmos,* that humans are not the centre of the Universe. Here, *Cosmos* begins to separate itself from other grand science-based narratives explored in the next chapter, and the Cosmic Calendar makes that point clear. However, Sagan does not leave the viewer lonely and worthless, what Catholic theologian John F Haught calls "cosmic pessimism," a "belief that the universe is altogether devoid of lasting meaning" (Haught 2017: 34). Sagan uses the Cosmic Calendar and the opportunities its visuals allow to show how special, how wonderful, and what a privilege all of life is, no matter what form life takes. Sagan clarifies that it is folly to think of us as all-knowing and all-powerful, but it would be equal folly to believe we are meaningless and lonely creatures. This is but one example among many of the power of narrative, visual construction, metaphor, and meaning that *Cosmos* demonstrates.[5]

[5] The Cosmic Calendar is a connecting thread that becomes pivotal to the series as a whole. In the 2014 reboot/spiritual successor, *Cosmos: A Spacetime Odyssey* (ASO), and the 2020 sequel, *Cosmos:*

As mentioned, metaphor has long been used by science communicators and popularizers, whether by language, photographs or drawings. Darwin famously used it to communicate his theory of natural selection in his 1859 *Origin of Species*, and many others have used it before and since. The 1973 television programme *The Ascent of Man*, mentioned above, also used metaphor in its description of the biological and cultural evolution that has shaped humankind. However, *The Ascent of Man* has another vital connection to *Cosmos* besides the crew, making it a critical text to contrast against. As recent work by the historian Alexander Hall has shown, *Ascent* offers a narrative form that he calls the "Humanist Blockbuster." For Hall, the Humanist Blockbuster:

> are big-budget nonfiction documentaries with multiple, typically exotic, filming locations, and cutting-edge graphic technologies, and are often coproductions between different media companies. They use science to help situate humanity's place within the universe, using a grand narrative centred on the progressive, and often redemptive, nature of scientific discovery. They rely on a language originally developed in a religious context, that of awe and spectacle, and use scientific theory to argue against any special place for humanity in the universe. Yet while they do this, they maintain some element or form of human exceptionalism, which argues that we are not merely any old animal species (Hall 2019: 157)

Hall details a broad range of attributes that qualify a text as a Humanist Blockbuster. As we can see, it considers the location, effects, and narrative, essential elements of an audio/visual text. It is important to note that this text is specifically aligned to detail a broad scope of space and time. However, in practice, this is much more isolated. The programme that Hall matches this to, *The Ascent of Man*, is precisely about its titular subject—man. This is,

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Possible Worlds, each hosted by Neil DeGrasse Tyson, the Cosmic Calendar was brought back, updated with the advances of time, scientific knowledge, technology, and an even larger budget. The Cosmic Calendar even graces the inside panel of the Blu-ray jacket of ASO, signifying its importance for the series.

therefore, much more similar to the other narrative form that we will explore in this project, the Epic of Evolution.

The "Epic of Evolution" was first detailed in Edward O. Wilson's (1929-2021) 1978 book, *On Human Nature*, which represents a critical narrative typology that historians of science have since taken up for works published since the 19th century. The Epic of Evolution, claims Wilson, holds:

> that the laws of the physical sciences are consistent with those of the biological and social sciences and can be linked in chains of causal explanation; that life and mind have a physical basis; that the world as we know it has evolved from earlier worlds obedient to the same laws; and that the visible universe today is everywhere subject to these materialist explanations. The epic can be indefinitely strengthened up and down the line, but its most sweeping assertions cannot be proved with finality…the evolutionary epic is probably the best myth we will ever have. It can be adjusted until it comes as close to the truth as the human mind is constructed to judge the truth (Wilson 1978: 201).

Again, as in the Humanist Blockbuster, we see in Wilson's vision grand sweeps of space and time, with the intentions fully apparent. He considers a scientifically informed myth sufficient for thinking about life without recourse to divine explanations. It isn't clear, though, that Wilson hopes to develop a unifying narrative architecture predicated on scientific principles, only that it is sufficient. Interestingly, historians took this up and extended it to grand sweeping narratives that included more than scientifically descriptive accounts of nature. With this in mind, Wilson approaches scientism. However, Wilson's definition of the Epic of Evolution is all-encompassing yet malleable, open to the ever-changing advances of scientific research.

While Wilson's conception of the Epic of Evolution has not become the dominant myth of the North Atlantic world, it is nonetheless a significant contribution that will play a role in this project. Wilson addresses the overlap between scientific and religious explanations of the world, taking a clear position in his claim that the world is "everywhere subject to these materialist explanations" that can be "indefinitely strengthened up and down the line", meaning that as the processes of science uncover more accurate, more comprehensive accounts of the world, they can be added, compounded to the story. For Wilson, raised a Southern Baptist who "read the Bible cover to cover" (Wilson 1998: 6), his position on the Epic of Evolution was informed by his reading of Gerald Holton's (1922-) 1995 book, *Einstein, History, and Other Passions: The Rebellion against Science at the End of the Twentieth Century*, where Holton argues that all material phenomena share a material basis and are reducible to laws of nature. In this way, science can build a story of explanatory propositions that, given sufficient time and research, can be "as close to the truth as the human mind is constructed to judge the truth" (Wilson 1978: 201).

Historians of science have taken the basic premise of Wilson's framework and provided historical evidence for the Epic of Evolution's historical precedent, finding cases that reveal its rich history (Secord 2000, Lightman 2007, Hesketh 2015, Zakariya 2017). Historians of science take the Epic of Evolution to mean narratives that move "through vast expanses of time…ranging across a series of scientific disciplines…by presenting heroes who performed deeds of great valour" (Lightman 2007: 220), used within a "world picture or cosmology in which evolutionary development is taken as the fundamental organizing principle; [and] the employment of this evolutionary world picture [is] not only as a description of the basic cosmic order in which human life has appeared but also as an aid in making normative judgments about how human existence should be oriented and lived" (Kaufman 1997: 175).

Ian Hesketh of the University of Queensland has written a brief genealogy of the Epic of Evolution. Hesketh claims that the philosophical foundations of the epic are Early German Romantic philosophies, especially Schelling's *Naturphilosophie* (1797), which attempted an outline of reconciliation between the deterministic world of nature and the willful world of human freedom. This amounted to a dualism between mind and body, or between human thought and the seemingly thoughtless world (Schelling 1988); we could even push this to science and religion in the abstract. Using this as the basis for what would become the evolutionary epic meant that the dynamism between human beings as seemingly unique observers of nature and nature as the object from which knowledge about the world and ourselves is derived set the stage for contemplation of a topic that was met with much enthusiasm and commercial success (Lightman 2007: 25, Secord 2000: 34).

Hesketh uses examples from the likes of Alexander von Humboldt (1769-1859) and Robert Chambers (1802-1871), who wrote *Kosmos* (1845-1862) and *Vestiges of the Natural History of Creation* (1844), respectively, to demonstrate the connection shared amongst them, such as the Romantic thread, the natural theological implications, and the focal point of pre-Darwinian evolutionary themes. He concludes with a modern example from David Christian and his academic discipline, Big History, which today includes textbooks, educational courses, high school curricula, conferences, journals, and a scholarly society. But the critical takeaway from Hesketh's genealogical overview of the Epic of Evolution is that "the moral lessons that the narrative of the natural world can teach us have become increasingly evident with every new recurrence of the genre" (Hesketh 2015:218). As with any narrative, the evolutionary epic has changed, adapting to the time in which it is embedded. Thus, this dissertation reflects this point of Hesketh's but takes it further, arguing for an adaptation—an evolution, if I may—of the narrative genre into a species of its own—the Grand Cosmic Narrative.

This project's chief aim is to show how *Cosmos* continues the story that historians of science have labelled the Epic of Evolution, but developed beyond that epic in ways that contribute to *Cosmos'* enduring popularity. *Cosmos* shares what Wittgenstein would no doubt refer to as a "family resemblance", having commonalities that, at least on the surface, reveal the elements of the genealogical lineage of science-based grand narrative storytelling ([1953]2009: 36). The evolutionary epic and the Humanist Blockbuster share in this historical tale, and do so in ways that provide meaningful engagement for the times and spaces from which they emerged. Each offered answer positions for the questions that were most meaningful to their intended audiences. *Cosmos,* too, shares in that engagement, a product of Cold War rationality and environmental degradation that was becoming increasingly more apparent.

But, *Cosmos* answers a newer, broader set of questions, differentiating itself by complementing grand narrative science storytelling with a worldview that is not about viewing natural law in new light in relation to the universe, but instead about how the view from science, in accordance with its principles and/or methods, affords moral implication akin to natural law that can build the scaffolding of an ethical framework to live with the world and for the world. *Cosmos'* thematic framing of science isn't predicated upon one particular 'paradigm' of inquiry, like the evolutionary epic, a text from when the winds of pre-Darwinian and post-Darwinian thinking set sail to new frontiers. Nor does it try to provide a sociobiological account of life and civilization, as the Humanist Blockbuster does. Instead, science is abstracted into an approach to the world—a scientifically informed but thoughtful stance toward oneself, one's neighbour, the environment, and the problems we face. *Cosmos* is a didactic text that educates, entertains, and encourages a worldview that reflects the abstraction of scientific methods into the viewer's life. *Cosmos* is a call to inquiry into the mundane, a challenge to authority, and a beacon of a hopeful future for the planet and

all its inhabitants, with no recourse to God, no emphasis on a single scientific discipline, and no Victorian ideals of progress to tie it all together. The Grand Cosmic Narrative, then, is a narrative genre whose defining characteristic is precisely this capacity: it produces in its audience an existential orientation, a durable framework of meaning, moral commitment, and affective attunement toward the Cosmos and one's place within it. It is this orientation-producing function that distinguishes the GCN from prior forms of science popularization and aligns it, structurally, with the cultural work that religious narratives have historically performed.

To make this case, the GCN frames the narrative with theological, religion-like affect-inducing qualities, but through scientifically informed, secular means. While the others—the Epic of Evolution and the Humanist Blockbuster—may share similarities, the Grand Cosmic Narrative goes beyond them in key ways. The constitutive feature that defines the GCN as a genre is the orientation-producing function identified above: its capacity to generate in its audience a durable existential orientation through affect-rich narrative. The differences enumerated below—in scope, medium, and narrative structure—are not individually genre-defining; they are the enabling conditions through which the orientation-producing function becomes possible. The specific mechanism through which the GCN produces this orientation—the distinct registers of enchantment it mobilizes in its audience—will be developed as a formal taxonomy in Chapter Three; the differences enumerated here are the structural prerequisites that make those registers operationally possible.

The first difference is that the GCN is not bound to the historical milieu of the Victorian period, nor the importance of 'transmutation' or evolution, as we call it now. This is the fundamental difference among all three. The Epic of Evolution and the Humanist Blockbuster are bound to evolution, both biological and cultural. It is no coincidence that both of these narrative types are closely, though not directly, associated with E.O. Wilson, as

both sources for the title of the Epic of Evolution and the creator of sociobiology, which structures the Humanist Blockbuster. While the examples we will explore in Chapter Two reveal that the Epic of Evolution does indeed engage with broad sweeps of time and uses an array of science to form its survey, the intention of, say, Robert Chambers' *Vestiges of the Natural History of Creation*, was to introduce "nebula-to-man cosmologies…to the English speaking world", to educate on theories of species origin, and to reduce the gap of authority between experts and non-experts (Chambers 1994: ix-xi).

Second, and of great importance, is the medium of television. This is another example of family resemblances enabling genealogical commonality between narrative forms. The Humanist Blockbuster set the stage, so to speak, for *Cosmos* by being the first grand-narrative evolutionary epic for television. It laid the groundwork for what was to come, but it was a specific story of life on Earth, the civilizations humanity developed, and the shared connection between the two. *Cosmos* differs by not only greatly expanding the scope of the narrative and the depth that comes with that expansion, but unlike the Epic of Evolution and the Humanist Blockbuster, it tells its grand narrative in a non-linear way, a way that is improved upon by the visual and audio accompaniment of the skilled production team. The results are a more profound sense of world-building and visualization, and a revealed spiritual quality that puts the viewer in relation to the natural world. By seeing the galaxy through a 'personal voyage', the viewer is guided by the host, Sagan, who, through close-up shots and some light acting, portrays a figure of trust rather than a book's authorial or impersonal tone, or the documentary mode of *The Ascent of Man*. As I outlined above, a strong emphasis on visual effects gave the natural world a sense of wonder and awe, something that has been much written about (Byerly 2019, Keltner and Haidt 2003, Nadis 2005, Rubenstein 2010). Moreover, the visual-audio experience also allows for much more personal emotion and depth, inspiring thoughts about the self and one's place in relation to other creatures and

objects, the politics of the time, and suggestions for how one is to live in such a revealed and mysterious world. The politics that Druyan exposed to Sagan become evident here.

Druyan revealed in the introduction to the accompanying book version of *Cosmos*, which was re-released with the premiere of *A Spacetime Odyssey*, that she and Sagan "were consciously going for a biblical cadence, words that scope out the ambitious territorial range of our explorations in space and time" (Sagan 2013: *xvii*). This "biblical cadence" is present throughout all three *Cosmos* series: *A Personal Voyage* (1980) (APV), *A Spacetime Odyssey* (2014) (ASO), and *Possible Worlds* (2020). It is particularly and notably evident in the first words uttered in both the 1980 and 2014 versions: "The Cosmos is all there is or ever was or ever will be" (Sagan *et al.* 2000).[6] The 2020 version continues this tradition with a voiceover from Sagan, but this time with the small amounts of preserved recordings available from the audiobook version of *Pale Blue Dot*: "We were hunters and foragers. The frontier was everywhere. We were bounded only by the Earth and the ocean and the sky. The open road still softly calls like a nearly forgotten song of childhood. For all our failings, despite our limitations and fallibilities, we humans are capable of greatness" (Sagan 1994: xiii-xiv, Druyan 2020).[7] Such dialogue is not typical of contemporary science popularization, and this secular-yet-religious quality throughout the audio-visual-narrative experience motivates this project (Mason-Wilkes 2018). While this has been explored in film (Schrader [1972] 2018), it has received little attention for its effects on the popularization of science.

It is critical to understand that *Cosmos's* non-linear narrative structure differentiates the GCN from the Epic of Evolution and the Humanist Blockbuster. While it may be the case that the Humanist Blockbuster, as Hall details, shares similarities with the GCN, the story is narrow, focused on life on Earth and the evolution of civilization. Further, it is formulated in

[6] Compare with Genesis 1; Psalm 90:2; Psalm 93:2.

[7] Poor storage conditions had led to the ruin of most of the recording.

a progressive narrative arc, moving from the past to the present in evolutionary and historical terms. On the other hand, *Cosmos* tells a nonlinear story of space and time, life and discovery, through the medium of the screen, with all the possibilities that come with digital production. This non-linear quality of storytelling, told through the screen, becomes a window into the discoveries of the ages, the various cultures, cosmic forces, and events that have shaped our understanding of ourselves and our universe. It hints at the possibilities for the future. The Grand Cosmic Narrative isn't about where we come from, how material forces and inert matter formed to create life and everything else, but about where we can go from here. The Grand Cosmic Narrative presents itself as a narrative about human potential in a changing world, positioning rational thought and evidence as foundations for an ethical and meaningful civilization and life—a vision communicated through the medium of television, which functions in the series as a "window" into future possibility. While educating on science is an objective of *Cosmos*, it is not the only one. It uses the explanatory power of science to tell a story that builds human confidence and encourages cooperation, framing science as an antidote to ignorance and superstition, or, as Sagan claims, dispelling darkness with the light of science (1996). It is this forward-looking stance—the eye to the horizon of possibility—that sets the Grand Cosmic Narrative apart. I will analyze *Cosmos* in this project to show how the programme inspires hope towards this greater, more prosperous possibility.

Another visual metaphor, though not intended to convey scientific information, was the Ship of the Imagination (SotI). Used in all three *Cosmos* series, the Ship of the Imagination serves as a visual metaphor for scientific exploration, framing the viewer's journey through space and time as one of wonder, mystery, and existential fulfillment. Fuelled by "imagination and skepticism both" (Sagan *et al.* 2000), SotI visually strikes an obvious resemblance, when Sagan or Tyson is at the helm, to what Lynda Walsh claims are

"the priest of this sanctuary, exhorting his flock to wonder" (2013: 146). While Sagan is dressed in his now famous turtleneck and corduroy jacket, it is Tyson's turn that drives the metaphor home, wearing a black suit jacket, black pants, and a black button-collared shirt (only missing the Clerical Collar!).

Neil deGrasse Tyson

Neil deGrasse Tyson's (1958-) trajectory from a transformative childhood visit to the Hayden Planetarium in 1967 to becoming one of the most prominent science communicators of the twenty-first century reflects both exceptional personal achievement and broader shifts in public engagement with science. Born October 5, 1958, in Manhattan, Tyson earned his Bachelor of Arts in Physics from Harvard College in 1980, followed by a Master of Arts in Astronomy from the University of Texas at Austin in 1983, under the supervision of Professor John M. Scalo. After an unsuccessful initial doctoral attempt at UT Austin—where his advisors dissolved his dissertation committee due to his extensive extracurricular pursuits—Tyson completed his Ph.D. in Astrophysics at Columbia University in 1991 under R. Michael Rich. His dissertation, "A Study of the Abundance Distributions Along the Minor Axis of the Galactic Bulge," analyzed galactic chemical evolution. A pivotal formative experience, which we will return to in a later chapter, occurred on December 20, 1975, when the seventeen-year-old Tyson visited Cornell University at Carl Sagan's personal invitation—a meeting that profoundly shaped his understanding of scientific mentorship and established a philosophical lineage that would later manifest in his role as Sagan's successor.

Since May 1996, Tyson has served as the Frederick P. Rose Director of the Hayden Planetarium at the American Museum of Natural History, overseeing the $210 million reconstruction of the facility, completed in 2000, and founding the museum's Department of Astrophysics in December 1997. His research contributions to astrophysics span star

formation, supernova physics, dwarf galaxies, and galactic structure, with sixty-nine publications cited by 1,509 other works according to his ResearchGate profile, including significant contributions to the Calán/Tololo Supernova Survey and service as co-investigator on the COSMOS Hubble Space Telescope project. Beyond institutional leadership, Tyson has held prominent advisory positions, including service on President George W. Bush's Commission on the Future of the United States Aerospace Industry (2001-2002), the NASA Advisory Council (2005-2008), and the Department of Defense's Defense Innovation Board (2016-2021). He has also amassed significant professional recognition, which includes election as Fellow of the American Physical Society (2001), American Academy of Arts and Sciences (2015), and American Philosophical Society (2021), along with the National Academy of Sciences' Public Welfare Medal in 2015 and NASA's Distinguished Public Service Medal in 2004 and 2011.

Tyson's impact as a science communicator has eclipsed his research contributions, demonstrated through eighteen books, including the New York Times bestseller *Astrophysics for People in a Hurry* (2017), which sold over one million copies, and *Accessory to War: The Unspoken Alliance Between Astrophysics and the Military* (2018), co-authored with Avis Lang. His StarTalk Radio podcast, launched June 1, 2009, has produced over 1,000 episodes and spawned a National Geographic Channel television adaptation (premiered April 2015), while his social media presence includes approximately 14.7 million Twitter/X followers as of 2025. Most significantly, Tyson continued Sagan's legacy by hosting *Cosmos: A Spacetime Odyssey* (2014) and *Cosmos: Possible Worlds* (2020), serving as both host and Executive Science Editor. The 2014 revival—executive produced by Ann Druyan, Seth MacFarlane, and Brannon Braga—premiered simultaneously across ten Fox networks on March 9, 2014, reaching 8.5 million viewers and ultimately 17.5 million including DVR viewing, with global distribution to 171 countries in 45 languages. The series received four

Emmy Awards, a Peabody Award, and the Critics' Choice Television Award for Best Reality Series, demonstrating that rigorous science communication could achieve mainstream cultural penetration in the twenty-first century as it had in 1980 with Sagan's original thirteen-episode series.

Tyson's connection to Sagan and his own prolific science communication and popularization work make him a qualified 'spiritual successor' for the *Cosmos* series, something that will be presented at the conclusion of the first episode of *A Spacetime Odyssey* (ASO). His public appearances and following may have contributed to the success of the *Cosmos* revival, putting the names of Tyson and Sagan in more cultural mindshare than would otherwise have been possible. For this reason, ASO will be included in all the content analysis sections of this dissertation. The implications of this spiritual succession for the rhetorical work the GCN performs—Tyson, like Sagan before him, occupying what Olman (2013) will help us name as a scientific-prophetic ethos—will be developed in Chapter Five.

The thirty-four-year gap between *A Personal Voyage* and *A Spacetime Odyssey* is not incidental to the argument but constitutive of it. If the Grand Cosmic Narrative were merely the product of Sagan's personal charisma, Cold War anxieties, or the state of video production technology in 1980, it would not survive transplantation into a different host, a different cultural moment, and a fundamentally transformed media ecology. That the core narrative form persists—its non-linear cosmic scope, its reoccupation of theological answer-positions, its deployment of affect-rich media to cultivate enchantment—while the surface features adapt to changed conditions constitutes evidence that the GCN possesses structural identity as a genre, not merely contingent identity as a singular cultural event. In Blumenberg's terms, this is his *Work on Myth* made visible: the narrative undergoes "work," adapting its imagery, its scientific content, its political urgencies, and its host's persona while preserving the core significance that its existential address demands ([1979] 1985). The

comparison between APV and ASO thus renders analytically demonstrable what the analysis of either series alone could only describe. Where the Epic of Evolution and the Humanist Blockbuster remain historically bounded forms—products of, respectively, pre-Darwinian transformism and mid-century British humanism—the GCN renews itself under what Taylor (2007) identifies as changed conditions of belief, and it is the generational gap that makes this renewal available for scrutiny.

Method

The method employed in this dissertation belongs to the tradition of theoretically informed close reading that has been developed across literary criticism, cultural studies, and the humanistic study of media texts, where interpretation is guided not by a fixed coding protocol but by a theoretically specified set of categories brought to sustained engagement with primary material.[8] Content analyses appear at the end of each chapter and employ a theoretically informed close reading of one episode from both APV and ASO series of the *Cosmos* television texts. This method combines the granular attention to language, structure, and figuration characteristic of literary close reading with systematic attention to the categories furnished by the dissertation's theoretical framework: Blumenberg's reoccupation, Taylor's conditions of belief, and the enchantment taxonomy developed in Chapter Three. Because *Cosmos* is a multimodal text—an integrated construction of scripted dialogue, visual imagery, musical score, and editorial pacing—the analysis attends to the interaction among these registers rather than treating the spoken word as a transparent proxy for the text's meaning. My aim here is a humanistic close reading that takes the text's audiovisual dimensions seriously as meaning-making elements. Episode selection follows from the

[8] see, e.g., Culler (2010) "The Closeness of Close Reading", and Felski (2015) *The Limits of Critique*.

dissertation's thematic architecture: each chapter's theoretical argument identifies the dimensions of the GCN that require demonstration, and the episodes analyzed are those in which those dimensions are most salient. This is a theoretically driven selection, and the analytical claims are intended to be illustrative of the GCN's operations rather than statistically generalizable. The method's limitation is that it depends on the analyst's interpretive judgment and willingness to view the time-stamped sections for themselves, a limitation shared by all humanistic close reading. Its strength is that it permits the kind of sustained, integrative attention to textual detail that quantitative methods cannot capture.

A methodological note on positionality is warranted here as well. I approach the GCN not as a disinterested observer but as someone for whom its narrative has personal resonance—a positionality I address more fully in the concluding chapter. This investment gives me access to the GCN's affective and existential dimensions that a purely external analyst might miss, functioning in a manner analogous to what Gadamer ([1975] 2013) calls the "productive prejudice" that makes hermeneutic understanding possible. At the same time, the analytical claims of this dissertation are designed to stand independently of my personal commitments. Where I describe the GCN's cultural operations—its reoccupation of theological answer-positions, its deployment of enchantment, its rhetorical strategies—I do so on the basis of the content analysis, historical evidence, and theoretical frameworks presented in the body of the work. Where I move beyond analysis to reflect on the GCN's significance or potential, I signal this shift explicitly. Readers will therefore encounter two registers in what follows: a dominant analytical register in which the GCN is treated as a cultural artifact to be explained, and an occasional reflective register in which I consider its broader implications. I have endeavoured to keep these registers distinguishable throughout.

Task

This project will take shape across six chapters, having begun here and continuing with the next five, each building on what was introduced in the previous one. The final chapter, chapter six, will serve as a conclusion, tying together the threads of the earlier chapters. Having spent time in the Academy across various disciplines, I have developed a project that reflects the varied training I have received. I plan to connect that training seamlessly across multiple fields and disciplines to reflect the opportunities that interdisciplinary humanities work offers. This project will be split into chapters that emphasize one aspect of my background, but I will consciously bring that core aspect into fruitful dialogue with the other areas of my academic training throughout each chapter.

Chapter Two traces the historical lineage of grand, "whole world" narratives, which I call the 'forebears' of the Grand Cosmic Narrative (GCN), by surveying 19th- and 20th-century science popularization that aimed to tell the story of the entire Cosmos. Drawing on scholars such as Ian Hesketh and Bernard Lightman, I will explore how works identified as the "Epic of Evolution" and the "Humanist Blockbuster" emerged within their respective cultural contexts. By mapping these narratives against the broader backdrop of the conflict thesis in science and religion, and notably through John Hedley Brooke's 'Complexity Principle,' the chapter sets the stage for situating Cosmos and the GCN within a continuum of science-driven creation stories.

It argues that while 'whole world' narratives historically carried overt or implicit religious dimensions, more recent incarnations like the GCN selectively adapt these elements. Conflicts portrayed between science and religion often serve as powerful marketing devices, but this chapter will show how *Cosmos* reaches beyond simplistic conflict narratives. A paradox, however, demands acknowledgment at the outset. If the conflict thesis remains dominant in popular consciousness, as the survey data from Ecklund, Baker, and others

consistently suggest, then how can a narrative which 'reaches beyond' the conflict thesis have achieved such extraordinary cultural penetration? The answer, I suggest, lies in a set of distinctions that will recur throughout this dissertation. First, there is the difference between cultural recognition and worldview displacement: *Cosmos* can be widely watched without its deeper philosophical architecture being widely internalized, something this dissertation seeks to clarify. Second, the GCN speaks most powerfully to a specific constituency—the 'spiritual but not religious,' whose numbers have grown dramatically in recent decades—rather than to the broader public for whom the conflict thesis functions as received wisdom. Third, and perhaps most importantly, the persistence of the conflict thesis may be less a function of media influence than of deeper structural forces, such as political polarization, institutional incentives, and what Charles Taylor (2007) calls the 'nova effect,' in which the modern condition generates an ever-expanding plurality of belief positions, some of which remain firmly conflict-oriented. The GCN, in other words, operates within a landscape it has not created and cannot single-handedly transform. In highlighting how the GCN diverges from previous storytelling templates, chapter two positions the GCN as an evolving, context-sensitive framework that inherits both scientific rigour and culturally familiar mythic motifs.

Chapter three addresses the philosophical underpinnings of secularization and how concepts of religious naturalism have shifted media narratives from explicitly theistic to non-theistic frameworks that still retain spiritual qualities. Charles Taylor's idea of the "immanent frame" and the "buffered self," shaped by the transformation of the conditions of belief in an increasingly secular age, sheds light on the growing popularity of narratives that blend scientific explanation with quasi-religious wonder. This phenomenon is illuminated through the interplay of what Taylor identifies as the transformation of the conditions of belief—in which the background framework through which the world is experienced shifts from one in which transcendence is taken for granted to one in which it becomes one option among

many—and the attempts at re-enchantment that emerge in response, as people seek sources of wonder and durable meaning outside traditional religious frameworks.

In this context, the GCN emerges as a culturally available alternative that specifically addresses the meaning-making needs of those who identify as "spiritual but not religious." It reoccupies the longstanding "answer positions" once dominated by faith traditions, offering scientific accounts of life's origins and moral frameworks rooted in the beauty and sublimity of the Cosmos. The GCN draws upon secular philosophical currents while mobilizing what Chapter Three will formalize as distinct registers of enchantment—at what science discloses, at what remains unknown, and at the narrative framing that invests this knowledge with existential weight—to construct a durable framework for meaning without recourse to a theistic deity.

Chapter Four delves into the power of storytelling and myth in shaping cosmic worldviews, introducing Hans Blumenberg's notion of "reoccupation." This concept explains how existential questions (such as "Why are we here?" and "What is our purpose?") persist even when their traditional theological answers lose traction. The chapter shows how mythic frameworks, informed by rhetoric, affect, and narrative devices, adapt and transform to suit new cultural conditions—including secular contexts that hunger for grand, unifying stories about existence.

The GCN is a prime example of reoccupied mythic space. By weaving scientific data with emotionally charged storytelling, it updates religious creation myths to address modern existential anxieties. Drawing on its cultural debt to Christian creation narratives, the GCN integrates moral imperatives, the affective force of cosmic wonder in its several dimensions, and calls to environmental stewardship anchored in the authority of science. This repurposing of myth underscores the Complexity Principle: belief systems are context-bound, and secularization does not erase faith but retools its story's shape for new audiences.

Turning to how such cosmic narratives reach broad audiences, Chapter Five surveys models of science communication and popularization—deficit, contextual, lay expertise, participation, and dialogue. Through these frameworks, it explores how works like *Cosmos* fit (and sometimes subvert) standard categories of science outreach. Popular culture's capacity to engage emotions, foster communal experiences, and reach broad audiences significantly shapes the public's understanding of scientific concepts, with audiovisual storytelling forging deeper bonds than text alone.

From this perspective, the GCN leverages visual spectacle, authoritative voices, and emotive narratives to produce affective responses—wonder, awe, a sense of cosmic belonging—that its narrative framing then converts into durable orientations toward meaning. This chapter underscores how programmes like *Cosmos* facilitate a religious-like collective viewing experience, building shared meaning that parallels the role of ritual or liturgy. By harnessing rhetorical strategies—ethos, pathos, and logos—the GCN effectively bridges scientific knowledge with moral urgency, offering a framework that is neither strictly "science communication" nor purely entertainment but a hybrid, culturally potent form of myth-making.

Lastly, Chapter Six integrates all previous discussions, articulating how the GCN expands upon conventional science-based narratives like the Epic of Evolution or the Humanist Blockbuster. Rather than glorifying humanity's rise or championing reason as a purely secular triumph, the GCN reincorporates spiritual depth and ethical guidance from religious traditions—minus explicit supernaturalism. By contextualizing Cosmos within the broader science–religion field, the chapter reiterates that the GCN fits a more nuanced, post-conflict schema that is post-conflict in its own internal logic and aspirations and aligns with the Complexity Principle of Brooke and Numbers. I use 'post-conflict' here to describe the narrative architecture of the GCN itself, not to suggest that the broader culture has moved

beyond the conflict thesis; the evidence, as I have noted, precisely suggests the opposite. The GCN is post-conflict in intention, even as it circulates within a culture that remains, in many quarters, firmly conflict-oriented. This emphasizes evolving cultural conditions rather than a linear march away from faith—an "immanent frame" for a post-secular age.

This culminating chapter examines how the GCN positions itself to address audiences seeking meaning in a scientifically revealed universe. At the end of each chapter, comprehensive case studies of *Cosmos* episodes show how such narratives provide cohesive visions of cosmic origins, moral responsibility, and wonder that perform cultural functions historically associated with religion. Chapter Six thus closes with a blueprint for future research, urging scholars to examine how science-popularizing media shape communal belief, identity, and ecological commitment by producing narratives that enchant through what they reveal, what they leave unknown, and the existential weight they invest in the story of the Cosmos.

These chapters together argue that a new kind of creation story, the Grand Cosmic Narrative, has emerged at the intersection of popular science media, secularization, and religious tradition. Unlike purely secular or purely religious discourses, the GCN reoccupies the mythic space once claimed by theological narratives, repackaging cosmic origins and moral imperatives in a framework that draws on the authority of science, the emotional resonance of spirituality, and the cultural familiarity of creation myths. This hybrid narrative form extends beyond older classifications such as the "Epic of Evolution" or "Humanist Blockbuster" by offering a re-enchanted vision of the universe: one that aspires to inspire devotion, instill moral responsibility, and connect individuals to a larger cosmic story, drawing its authority from scientific credibility. By studying *Cosmos*, I propose that the GCN exemplifies post-secular studies of how science narratives can operate within the contested space opened by the transformation of belief, shaping collective meaning and individual

identity in a rapidly changing cultural landscape in which traditional religion within the Abrahamic lineage is just one option among newer ones.

A Note on Terms

The preceding sections of this chapter have introduced the argument, the primary texts, and the trajectory this dissertation will take. Before proceeding to the substantive historical and theoretical work that begins in Chapter Two, it is worth pausing to clarify the register in which I deploy several terms that have already appeared and will continue to do important work throughout this project. This dissertation operates at the intersection of several fields—the history of science, the sociology of religion, cultural theory, and media studies—and the same term can carry very different meanings depending on the tradition in which it is deployed. What follows is not a glossary but an orienting statement of register, making explicit what might otherwise remain implicit and ensuring that the reader engages with the argument on the terms I intend rather than those imported from any single discipline.

Of the terms deployed in this project, none are more fundamental, nor more contested, than "science" and "religion." Peter Harrison, in *The Territories of Science and Religion* (2015), has shown that these terms, as we currently understand them, are modern constructions. Neither "science" in the sense of a coherent enterprise with a shared methodology, nor "religion" in the sense of a discrete set of beliefs and practices separable from culture and politics, would have been recognizable to most people before the early modern period. Before the professionalization of science in the 19th century, what we now call science was embedded in a much broader set of activities—natural philosophy, natural history, and to some extent medicine—that were not understood as belonging to a single enterprise. Similarly, "religion" as a category distinct from culture, politics, and social life is

largely a product of the post-Reformation European settlement that created the conditions for the separation of the sacred from the secular.

This matters because my concern is not with the internal practices, methodologies, or truth-claims of any particular scientific discipline, nor with the doctrines, liturgies, or institutional structures of any particular religious tradition. I employ "science" and "religion" deliberately at a general register, as cultural categories that do structural work in public discourse and popular consciousness. When I refer to "science," I mean the broad enterprise of empirical inquiry as it is understood and represented in public life—the cultural authority it carries, the narratives it generates, and the existential implications it is perceived to hold. When I refer to "religion," I am concerned less with specific denominations or systematic theology than with the affective, cultural, and existential functions that religious traditions perform: the provision of meaning, moral orientation, communal belonging, and the experience of transcendence. I adopt this register because the object of my analysis, *Cosmos*, operates at precisely this level—it speaks of "science" and engages with "religion" not as scholars in those fields would narrowly define them, but as the terms function in the cultural imagination of the North Atlantic world. This is a deliberate methodological choice, not a lack of precision; it reflects the level at which the Grand Cosmic Narrative itself operates.

Related to both terms and pervasive throughout this dissertation is "worldview." The concept has a rich intellectual history, which, for my purposes here, is traceable to Wilhelm Dilthey's *Weltanschauung* in the late 19th century, and it has since been taken up across philosophy, theology, and the social sciences with varying degrees of specificity (Naugle 2002). I use the term to mean a comprehensive orientation toward reality: a framework of assumptions, whether explicit or tacit, about the nature of the world, one's place within it, and how one ought to live. A worldview encompasses not only cognitive beliefs but also affective dispositions, moral commitments, and a sense of what constitutes human

flourishing. Both science and religion, as I deploy them here, are capable of generating worldviews, and the Grand Cosmic Narrative, as I have argued above and will demonstrate in the chapters that follow, is precisely an attempt to construct one. The term, therefore, appears throughout this work in connection with the meaning-making capacities of narrative, the conditions of belief that Charles Taylor describes, and the answer positions that Hans Blumenberg theorizes.

I introduced above the geographic and civilizational scope of this dissertation: what Charles Taylor, in *A Secular Age* (2007), calls the "North Atlantic world." It is worth reiterating here that this is a civilizational designation, not merely a geographic one. It encompasses the societies of Western Europe, the United Kingdom, Canada, and the United States that share a common trajectory of Christian formation, the Reformation and counter-Reformation, Enlightenment rationalism, and the secularizing processes central to this dissertation's argument. The term carries with it the specific historical conditions of secularization that make the emergence of the Grand Cosmic Narrative intelligible, and every claim I advance in this dissertation should be understood as scoped to these conditions. The reasons for narrowing further to the Canadian and American context have been stated above; the important thing to note here is that "North Atlantic world" designates a shared civilizational inheritance, rooted in what Taylor calls "Latin Christendom" (2007: 21), and it is this inheritance that furnishes the cultural and epistemic ground on which the Grand Cosmic Narrative takes shape.

The Grand Cosmic Narrative, as its name suggests, belongs to the category of "grand narratives" or "metanarratives"—terms that carry substantial intellectual baggage from Jean-François Lyotard's *The Postmodern Condition* (1979). Lyotard famously characterized postmodernity as "incredulity toward metanarratives" ([1979] 1984: xxiv), and for many scholars, particularly those working in the wake of poststructuralist and postcolonial critique,

grand narratives are understood as instruments of power that ought to be treated with suspicion. I take this critique seriously, and Chapter Two will engage with Lyotard's framework in detail. However, this project does not share Lyotard's incredulity so much as it takes the persistence of grand narratives as a phenomenon requiring explanation. Grand narratives, understood here as comprehensive, totalizing stories that situate the human condition within a larger framework of origin, meaning, and purpose, continue to circulate, to be produced, and to command adherence, even in the putatively postmodern cultural conditions Lyotard described. The question this dissertation asks is not whether grand narratives are epistemologically legitimate but what cultural work they perform, why they persist, and what happens when the content of such a narrative is drawn from science rather than theology. By "grand narrative," then, I mean a story that aspires to comprehensive scope and existential significance—one that addresses not a particular domain of experience but the totality of human orientation toward reality.

The terms "secular," "secularism," and "secularization" are among the most contested in the human sciences and studies, and they will receive sustained treatment in Chapter Three, drawing on the work of José Casanova (2011) and Charles Taylor (2007). It would be premature to define them fully here, as their complexity is part of the argument of that chapter. However, since these terms have appeared throughout the preceding sections of this introduction—where I have referred, for instance, to a "secular cosmogony" and a "secular transcendent quality"—a brief orienting note is warranted. When I use "secular" in the first two chapters of this dissertation, prior to the fuller treatment in Chapter Three, I use it in the general sense of "non-theistic" or "this-worldly": pertaining to that which does not depend on or invoke a transcendent deity. This is a placeholder, not a definition. Chapter Three will complicate this usage substantially by showing that the secular is itself a theological category with a Christian genealogy, that secularization is not a simple subtraction of religion from

public life, and that the conditions of belief in the contemporary North Atlantic world are far more complex than any binary of “secular” versus “religious” can capture.

Post-secular too is worth mentioning here, and by this I mean to refer to a hybridization between Jürgen Habermas (2008) and Charles Taylor’s (2007) deployment. For Habermas, the post-secular gives definition to a possible future in which our current public square engages secular citizens to recognize the continuing vitality of religion and to undergo a complementary learning process with religious traditions whose semantic potentials secular reason alone cannot generate. For Taylor, the closely cognate condition, the “immanent frame,” in which belief and unbelief operate as mutually cross-pressured options within transformed conditions of belief, is what he calls the “nova effect”. Mapping these two terms onto the same field yields, I believe, an asymmetrical hybrid operating at two interdependent registers: a cognitive/communicative one (Habermas) and a phenomenological/structural one (Taylor). With this hybrid in mind, this term designates secularization as having restructured the field of meaning such that theological functions persist within secular registers, generating ongoing translation between idioms and a proliferation of spiritual options whose vitality is itself an artifact of both the transformed conditions Taylor describes and the dialogical adjustments Habermas demands. I would push this further by situating this term neatly into Galen Watts and Sarah Wilkins-Laflamme (2026) term, late-stage secularization, which points towards this very hybridization.

Finally, this dissertation takes a popular television programme as its primary object of analysis, and this choice requires a word about “popular culture” as a category. Within science and religion studies, popular culture has not yet been granted the sustained scholarly attention it deserves. As noted above, Hall and Mason-Wilkes (2024) observe that their edited volume represents “the first collection of its kind to explicitly explore the role of popular media formats themselves as mediators in institutional debates on the relationship between

evolution and religion" (4), a telling indication of how recently the field has begun to take media texts seriously as objects of analysis. One of the aims of this dissertation is to contribute to this emerging area.

By "popular culture" I mean the texts, media, and practices of everyday life that shape public worldviews and meaning-making—not as a pejorative category opposed to "high" culture, but as a site of genuine cultural production and negotiation. This understanding draws on a tradition in cultural studies, from John Fiske's (2010) insistence that audiences actively make meaning from the cultural commodities they consume, to Michel de Certeau's ([1980] 1984) account of the "tactics" by which people repurpose the products of dominant systems. Popular culture, understood this way, is not simply what is commercially produced for mass audiences but what audiences do with those productions: how they interpret, appropriate, resist, and incorporate media texts into their own frameworks of meaning and identity. *Cosmos*, broadcast in over sixty countries and, as noted above, viewed over a billion times, is a popular cultural text in the fullest sense—it is both a commercially produced media commodity and a site where billions of viewers have encountered, negotiated, and in many cases adopted a particular orientation toward science, the Cosmos, and their place within it. Chapter Five will develop the theoretical frameworks for understanding science communication and popular culture in greater detail; my concern here is simply to signal that I treat popular culture as a serious analytical category and not a diminished one.

With these terms now clarified, we can proceed to Chapter Two, where the historical lineage of the Grand Cosmic Narrative begins to take shape. "Come with me."

Chapter Two

Grand Narratives

Science is far from a perfect instrument of knowledge. It's just the best we have. In this respect, as in many others, it's like democracy. Science by itself cannot advocate courses of human action, but it can certainly illuminate the possible consequences of alternative courses of action. – Carl Sagan, The Demon-Haunted World

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Introduction

As a widely known public figure for science education and popularization, Carl Sagan was known for his eloquent use of language to convey the information he wanted the public to know. Many of his books, like *The Demon-Haunted World: Science as a Candle in the Dark* (1996), used poetic prose and vivid metaphors to capture the reader's imagination and drive home his message of hope for a humanity that conquered its fears and superstitions, using the knowledge that science reveals in search of a brighter future; the quote above speaks to hope. But it also reveals something else this chapter intends to clarify: science, as an instrument of knowledge alone, is solely incapable of achieving a flourishing world; it offers the materials but not the scaffolding. It has the raw explanatory power, but lacks the meaningful framework needed to construct, from those materials, a dwelling fit for human meaning-making. However, the materials of scientific knowledge, combined with the framework of story, narrative, and meaning, may bring about the change that Sagan and others have hoped for. This chapter explores science and narrative. It is about how different authors have used

grand narratives of science at various times to achieve different ends. This chapter is also a story about the fine line between science and religion, and between narrative storytelling and the scientific method.

In the last chapter, I gave the background and overview of this dissertation's goals, situating this project firmly within the field of science and religion. While a relatively recent area of study, many authors have published on the relationship between these two critical enterprises, making it a popular topic and providing a rich discourse for both academic and general readers. In our contemporary landscape, YouTube and other digital media platforms, such as TikTok and Instagram, host abundant content on or related to science and religion. Using my YouTube account, I can search "science and religion" and find a wide range of videos on debates, lectures, personal stories, and video essays; using 'Incognito Mode', an option that disables tracking, allowing for algorithm-trained free search results, for the exact phrase, surprisingly, returns similar results. While this plentifulness no doubt offers a bountiful catalogue of content to choose from, it is important to be aware of the dangers of reading or watching misguided, ill-informed work. By this, I refer once again to the prevalence of the failed conflict thesis.

As discussed in Chapter One, the conflict narrative took form and was quickly popularized in the late nineteenth century by the works of John William Draper and Andrew Dickson White's *History of the Conflict Between Religion and Science* (1874) and *A History of the Warfare of Science with Theology in Christendom* (1896), respectively (Brooke 1991, Ecklund 2010, Harrison et al. 2010, Hardin et al. 2018, Lightman et al. 2019, Spencer 2023). The conflict (or warfare) thesis is an argument that science and religion are engaged in an unavoidable conflict as the two are wholly incompatible, as "the one is dealing in testable facts, the other deserting reason for faith; the one relishing change as scientific understanding advances, the other finding solace in eternal verities" (Brooke 1991: 2). Draper and White set

a precedent that would take hold of the popular mind to such an extent that it is a truism that science, and even scientists, are fundamentally opposed to religion. That the conflict thesis has achieved the status of truism—unexamined, seemingly self-evident, resistant to counterevidence—is itself part of what makes the cultural success of the Grand Cosmic Narrative so theoretically interesting. A truism, by definition, operates below the threshold of critical scrutiny; one can watch *Cosmos*, be moved by its vision of cosmic interconnection, and yet never consciously register that its narrative architecture is incompatible with the conflict framework one otherwise takes for granted. Cultural influence, in other words, need not be ideologically coherent to be real.

Elaine Howard Ecklund of Rice University has published extensively on public and professional perceptions of science and religion. Securing numerous large grants, Ecklund has produced large-scale sociological studies of attitudes of scientists at elite US academic institutions (2010), congregation and church leaders (2018), global scientists (2019), and lessons gleaned from her research (2020). Together, Ecklund gathered data from nearly 41,000 scientists and people of faith, with almost 1,300 in-depth interviews (2020: 17). Ecklund agrees that White and Draper were instrumental in instilling the popular idea of conflict between science and religion in elite academic institutions in the US. As the co-founder and first president of Cornell University, White used his platform of influence to instill the conflict message, even hinting at it in the Ivy League school's motto: "I would found an institution where any person can find instruction in any study," alluding to its secular ideals. In Ecklund's research, she found that "many Americans see scientists as not only lacking faith, but as actively *opposed* to religion" (2010: 4), crediting the conflict thesis as being alive and well in the popular mind. Later in 2018, Ecklund and her colleague Christopher P Scheitle stated that "many people [in the US] think that religious Americans are not interested in science—or, worse, hostile to science" (5). This perception—durable,

widespread, and empirically well-documented—presents us with a puzzle that will animate much of what follows. If the conflict thesis is so deeply entrenched in the American popular imagination, and I would suggest the North Atlantic world, then what are we to make of the simultaneous cultural success of narratives like the Grand Cosmic Narrative, which, as I shall argue, operate according to a fundamentally different logic? The answer lies partly in audience segmentation: the populations most receptive to the GCN—particularly the growing 'spiritual but not religious' constituency—may not be the same populations for whom the conflict thesis functions as settled common sense.

What Ecklund and her colleagues had done in this extensive system of connected research projects was to confirm, through qualitative and quantitative sociological data, the Complexity Principle: that science and religion, and their interactions, yield varied outcomes—they are complex. However, they also showed that the conflict thesis holds in the popular mind regardless of 'side'. Though challenged as early as Ian Barbour's 1966 work, the conflict thesis has persisted in the discourse surrounding science and religion, despite many attempts by scholars and even members of science and faith communities. This persistence requires explanation, particularly given the argument I am developing about the cultural significance of the Grand Cosmic Narrative. I propose that the conflict thesis and the GCN may, in fact, address different constituencies and operate at different registers of cultural influence. The conflict thesis thrives in contexts of political polarization—in school board debates, in culture-war media, in the rhetorical strategies of both the New Atheists and religious fundamentalists, each having institutional reasons to maintain the conflict framing. The GCN, by contrast, speaks most powerfully to the 'spiritual but not religious' as a constituency that has, in a sense, already opted out of the conflict thesis and is searching for alternative frameworks of meaning. The coexistence of both narratives is thus less

paradoxical than it initially appears, once we attend to the segmented character of the contemporary meaning-making landscape.

While Ecklund's findings largely confirm what historians of science had long suspected, the empirical rigour of her work is nonetheless an excellent resource for highlighting the possible attitudes that underlie common misconceptions about the interactions between science and religion. However, what is striking in Ecklund's work is that a small but significant portion of scientists identified as spiritual but not religious (SBNR), a growing area of interest for academics and research bodies. For example, Galen Watts' 2022 book, *The Spiritual Turn: The Religion of the Heart and the Making of Romantic Liberal Modernity*, argues that the "religion of the heart" (11) is the source of the North Atlantic world's "romantic liberal modernity" (11). Watts traces, through political philosophy, the sociology of religion, and his own qualitative data gathered at various places of gathering in Toronto, Canada, that the 1960s, when ideas of secularization swept academic discourse in solidarity with the cultural revolution in the US, was a time of "tremendous religious ferment" (11). Watts has more recently extended this analysis with sociologist Sarah Wilkins-Laflamme, arguing that contemporary spirituality constitutes a distinct religious formation organized around an experiential epistemology, an immanent ontology, and a soteriology of self-realization (Watts and Wilkins-Laflamme 2026). This is a characterization that maps with a high degree of precision onto the meaning-making framework I will argue *Cosmos* offers its SBNR audience in the chapters that follow.

These findings are more consequential for my argument than they might initially appear. The SBNR category represents precisely the constituency for whom the Grand Cosmic Narrative is most likely to function as a live option—a population that has not abandoned the search for meaning and transcendence but has detached that search from institutional religion and, crucially, from the conflict thesis that maps so neatly onto

institutional battle lines. If the GCN's cultural influence is real but has not displaced the conflict thesis from popular consciousness, the SBNR population may represent the specific demographic within which that influence is most clearly operative—a growing but still minority constituency whose experience of the science–religion relationship differs markedly from the broader public's

This is symptomatic of and related to the growing interest in cultural critique and research to better understand how human flourishing can be just that, even when divides seem wider than ever before. The various Templeton groups, specifically the Templeton World Charity Foundation (TWCF) and the John Templeton Foundation (JTF), have launched major funding initiatives in spiritual and human flourishing, designed to support research on SBNR groups. Ecklund's work would appear to be an early sign of the importance of this growing group. Over 20% of the 1700 respondents of elite-institution scientists identified as SBNR (2010: 51). Of those in that 20%, 40% of them she refers to as "spiritual entrepreneurs," those "looking for new ways to hold science and faith together yet still free of the constraints of traditional religion" (Ecklund 2010: 54). This suggests that these people are looking for something different from what can be found in conventional and/or traditional religious institutions, something that matches their worldview and material perceptions of the world, something that offers "meaning making without faith" (Ecklund 2010: 58). It is these people, those looking to "hold science and faith together" but without institutional religion or traditional belief structures, something broad, appealing, educational, and meaningful for the general public, for whom the GCN appears structurally well-suited as a cultural resource. The preceding content analysis demonstrates that *Cosmos* provides precisely the kind of meaning-making framework—scientifically grounded, affectively rich, institutionally unaffiliated—that Ecklund's "spiritual entrepreneurs" report seeking. This alignment grounds my claim about the GCN's audience. I recognize that testing this

hypothesis would require empirical reception studies—audience surveys, ethnographic engagement with *Cosmos* viewing communities, and/or systematic analysis of viewer responses on social media platforms—that fall outside the scope of this dissertation, but represent a priority for future research, as I outline in the concluding chapter.

The attitude and requirements of these spiritual entrepreneurs are precisely the type of group that would find the narrative style of the Grand Cosmic Narrative in *Cosmos* so compelling. Seeking new meaning-making paths to spiritual 'nourishment' without recourse to the established religions has been documented for some time (Josephson-Storm 2017). However, the various forms these take are loosely related. They are performed by people seeking similar connections, purpose, and meaning, but in wildly different forms of practice that rarely, if ever, have points of contact. For example, Yoga is not the same as the occult practice of "Reality Shifting" and is likely rarely practiced in the same space (Lawrence 2025). There is no unifying narrative, no shared, passed-on story that grounds the practices of the occult. A critical consideration in what the Abrahamic faiths have in common, among other things like ritual, symbolism, and structural temporal and spatial definition (and others), is that they have shared narrative threads; they have stories that connect and separate at different places for different historical and cultural reasons—books that have become sacred through time and practice. The same applies to other established faiths and spiritual practices, such as Buddhism or Hinduism. For example, Buddhism in the Tibetan tradition differs from the Chan or Zen traditions but shares core similarities.

The transformation of Abrahamic faiths during modernity has shown significant connections to the rise of the "spiritual but not religious" (SBNR) identity and contemporary interest in occult practices. The modernization of institutional religion—characterized by rationalization, bureaucratization, and the decline of traditional authority structures—created conditions enabling alternative spiritualities to flourish in what Christopher Partridge terms

an “occulture,” a diffuse reservoir of esoteric beliefs and practices that permeates popular culture (Partridge 2004). This relationship operates through several mechanisms: the shift from communal religious authority to individual spiritual autonomy, documented extensively in Linda Mercadante’s interviews with SBNR individuals who explicitly reject institutional religion while maintaining active spiritual seeking (Mercadante 2014); the creation of a “spiritual marketplace” as traditional religious monopolies weakened, allowing previously marginalized practices to gain cultural legitimacy (Roof 1999); and the re-emergence of Western esoteric traditions that, as Wouter Hanegraaff demonstrates, were historically suppressed by Christian hegemony but never disappeared, finding new visibility amid religious pluralization (Hanegraaff 2013). Rather than representing simple causation, these dynamics suggest a mutually reinforcing pattern in which modernity simultaneously transformed traditional religion and created space for alternative spiritualities, which, in turn, further challenged institutional religious authority.

These different forms of belief and practice perhaps share a loose affiliation, leading to the fracturing of ontology, meaning the world’s meaning becomes increasingly divided, as one group may hold a set of ideals while performing practices that differ from those of another group. While this isn’t the place to conjecture on the role that such fragmentation has in othering and alienation, it would not be amiss to suggest, as others have (Linklater 2009, Adebanwi 2016, Weller 2017, Deuze 2021), that the cultural appeal of a narrative that could unify diverse practices under a shared framework while maintaining respect for diversity may help explain the popularity of *Cosmos*. It builds a narrative encompassing everything while (mainly) respecting the diversity of beliefs and practices worldwide. As a grand narrative, *Cosmos* and the Grand Cosmic Narrative follow in the footsteps of a long history of grand narratives. In the following section, I will explore two such grand narratives, the Epic of Evolution and the latecomer, the Humanist Blockbuster. While the stories of religions have

been grand narratives that have served for millennia, religion and grand narratives have come under attack in the modern world. These modern critiques stemmed from a report in Jean-François Lyotard's 1979 work, *The Postmodern Condition*.

Grand Narratives

Jean-François Lyotard (1924-1998), a French social philosopher, was invited by the Conseil des Universitiés to assist the provincial government of Quebec in writing a report on the state of knowledge in the wake of the Quiet Revolution (1960-1976) and the October Crisis (1970). Lyotard, raised and educated in Paris, was raised in a culture of revolution and political activism at home and in (then) French colonies, notably Algeria. Lyotard's politically charged background is vital for reading his most notable work, *The Postmodern Condition* (1979). Borrowing from American sociologists and cultural critics emerging during the Countercultural Revolution of the 1960s, postmodernism describes "the state of our culture following the transformations which, since the end of the nineteenth century, have altered the game rules for science, literature, and the arts" (Lyotard [1979] 1984: xxiii), or more simply defined, postmodernism is the "incredulity toward metanarratives" (Lyotard [1979] 1984: xxiv). The report, in the spirit of such transformations, is interested in "the context of the crisis of narratives" (Lyotard [1979] 1984: xxiii), and for Lyotard, no other enterprise has conflicted with narrative more than science and religion.

Influenced heavily by Ludwig Wittgenstein's *Philosophical Investigations* (1953), Lyotard argued that the language games of the sciences, or the academic language of the white tower elite, are seemingly at odds with narrative as the investigations of scientists contribute to the knowledge-base we associate with science that then upends our language, modifies our understanding of the world, and redirects our attention to the material truths of and about the world. According to Lyotard, the narrative stability of long-standing religious

authority was overturned by science's claims, whether or not they were correct. So, what was once true of the spirits of the deceased came into question, or what was once true about humanity's place in relation to animals was flattened. Sagan refers to this process of a narrative's stronghold being undone by science as the "great demotions" (1994), and Charles Taylor, whom we will get to shortly, identifies this as what he calls a "subtraction story"—a framing he ultimately critiques (2007). But Lyotard argues that this presents a paradox—a confusion of circumstances with significant consequences: science itself has sufficient epistemic material for a narrative about itself, with its own outputs and use-values. Even though most theories from various disciplines and fields of science turn out to be incorrect or superseded, science is presented in the North Atlantic world as an authority on matters, as purely objective. This is itself a grand narrative about science.

Lyotard concerned himself with this as it spoke to the metanarrative, or grand narrative, of the Enlightenment, ideals in which "the hero of knowledge works toward a good ethico-political end—universal peace" (Lyotard [1979] 1984: xxiv). But as history has demonstrated, human beings are fallible creatures. Great men, and sometimes women, have been leaders, bringers of hope, and harbingers of a more prosperous and healthy tomorrow, only to be stricken down by some complication of circumstance or lapsed moral judgment. Scientists are, of course, no different, but as the structure of science is a stage in which scientists carry out their "play", it is the policymakers, the politicians, who direct the play and fill the theatre's seats. Regardless, the critique of the Enlightenment is used as an example that illuminates a metanarrative. As a result of subsequent disenchantment with its ideals—such as reason, rationalism, empiricism, and progress—the metanarrative loses its use-value.

For Lyotard, this suggested that the values of the Enlightenment held by institutions and structures of power should be treated with and kept at a skeptical distance. The answers of science, the offerings of the Church, the positions of government were to be treated with

the same critical and skeptical stance as anything else—power was the antithesis of justice. Justice, in the wake of what was happening in Quebec in the late 1960s-1970s, was of great concern to the people of that province and the country more widely, and it reflected developments in the USA. Since science was a source of power, Lyotard claimed that science and its epistemic outputs were not to be assumed correct; this was modified by a historical view of science having been wrong many times in the past. As Lyotard so bluntly put it,

> Science has always been in conflict with narratives. Judged by the yardstick of science, the majority of them prove to be fables. But to the extent that science does not restrict itself to stating useful regularities and seeks the truth, it is obliged to legitimate the rules of its own game. It then produces legitimation with respect to its own status, a discourse called philosophy" (1979: xxiii)

Lyotard makes a critical argumentative move by situating science in a combative role. The elegance of this claim is that we can swap 'narratives' with, say, 'religion', and the argument still holds. Lyotard writes that "narratives allow [a] society in which they are told, on the one hand, to define its criteria of competence and, on the other, to evaluate according to those criteria what is performed or can be performed within it" (1979: 20). We can see how narrative for Lyotard functions as a framework for a culture, the shape of its character, and in this sense those things that aren't science, yet have cultural epistemic legitimacy, conflict with science.

Since the publication of Lyotard's *The Postmodern Condition* (1979), the concept of the "postmodern condition" or "postmodernism" has been taken up across multiple intellectual trajectories. However, the relationship between Lyotard's specific philosophical project and subsequent scholarship is more complex than a simple line of descent. While various interdisciplinary fields—including cultural studies, queer studies, and gender studies—have engaged with critiques of grand narratives, these fields emerged from diverse intellectual genealogies that often predated or developed independently from French

poststructuralism. Cultural studies, for instance, drew substantially from British Marxism (particularly the Birmingham School) and New Left historiography, while feminist and queer theory synthesized insights from psychoanalysis, phenomenology, and political activism alongside poststructuralist thought.

The French theorists of the 1960s and 1970s—including not only Lyotard but also Foucault, Derrida, Deleuze, and others—did subject metanarratives to sustained critique, indeed, though their approaches varied considerably. Rather than simply dismissing grand narratives as "outdated rot," these thinkers offered sophisticated genealogical analyses of how particular knowledge claims became naturalized and how discursive formations functioned as mechanisms of power. Foucault's archaeological and genealogical methods, for example, examined how regimes of truth emerged historically rather than arguing for their wholesale abandonment. Similarly, Lyotard's own position was more ambivalent than a wholesale rejection—he described the postmodern condition as characterized by "incredulity toward metanarratives" rather than advocating their elimination, and he acknowledged the continued necessity of localized, pragmatic narratives, even radically reversing his position in his later life.

Moreover, characterizing this critique as targeting "metaphysical" thinking requires qualification. Many poststructuralist thinkers were deeply engaged with metaphysical questions even as they interrogated the foundations of Western metaphysics; Derrida's deconstruction, for instance, operated within metaphysical discourse to reveal its internal tensions rather than positioning itself entirely outside it. The relationship between poststructuralist critique and power is also more nuanced than the phrase "instruments of power and control" suggests. These thinkers examined how knowledge and power were mutually constitutive, rather than treating grand narratives as mere tools wielded by powerful agents.

Today, critiques typically fall on the usual suspects of religion and science (Stenmark 2001). Yet other objects of study have been investigated, such as political theory (Amery 2008), secularization (Clark 2012), and environmentalism (Rolston 2009). This all points to a larger school of thought that Lyotard was part of—the postmodern movement, which includes academics and intellectuals such as Fredric Jameson, David Harvey, Arthur Kroker, Ihab Hassan, Jean Baudrillard, and others. Jameson, in *Postmodernism, or, The Cultural Logic of Late Capitalism* (1984), conceives postmodernism as the cultural expression of late capitalism—an age marked by depthlessness, the waning of affect, and the commodification of culture. Harvey, in *The Condition of Postmodernity* (1989), grounds his analysis in political economy, interpreting postmodernism as the aesthetic and ideological counterpart to a new regime of "flexible accumulation" characterized by spatial and temporal compression. Kroker, in *The Postmodern Scene: Excremental Culture and Hyper-Aesthetics* (1986), describes postmodernism as the technological intensification of culture —a cybernetic implosion in which reality collapses into simulation and excess. And Hassan, in *The Dismemberment of Orpheus* (1971) and *The Postmodern Turn* (1987), charts the literary and philosophical sensibilities, defining postmodernism by indeterminacy, irony, play, and the dissolution of hierarchy. Baudrillard and Kroker, in particular, are important to us because they saw television as an essential aspect of postmodern cultural life, arguing that representations could no longer refer to any underlying reality but instead produced their own self-referential world of signs—a process he called the "precession of simulacra."

But even with such broad appeal for skepticism and distrust of grand narratives, and the sources of power from which they originate, they nonetheless appear in day-to-day life with frequent fervour, whether conscious of them or not. Unfortunately, those who have spoken, and continue to speak, about the role of grand narratives in everyday life have often been met with hostility (both rightly and wrongly) in the Academy and on social media by the

political left and right. There are those within and outside the academy who are critical of postmodernism, including Noam Chomsky, Jordan B. Peterson, Jürgen Habermas, and Roger Scruton. And while these figures gained prominence beyond their primary scholarly fields, the nature and reception of their visibility differ considerably, for they are often part of older disciplinary traditions or operate beyond the bounds of the secular university system through YouTube or other platforms. For example, Chomsky's political commentary developed alongside but was distinct from his linguistics work, whereas Peterson's public profile emerged more directly from culture-war controversies that blurred the boundaries between his academic psychology and broader cultural commentary.

Chomsky and Peterson, in particular, are noteworthy for their critique of grand narratives, in contrast to Lyotard's framework. Chomsky critiques liberal democracies for failing to live up to Enlightenment ideals—his is an immanent critique within the progressive narrative, not skepticism toward metanarratives as such. Peterson actively defends grand narratives, particularly Judeo-Christian and Jungian archetypal frameworks, arguing we suffer from insufficient rather than excessive connection to them. This may explain the ambiguous status of Peterson's Christianity, which may be partly why theologians—who are, for obvious reasons, invested in grand narratives—have been reluctant to embrace him as an ally, even as they exclude his more outlandish and uncredentialed claims.

The use-value of a grand narrative is at a point of tension not unlike that of the discourse on science and religion outlined in Chapter One. On the one hand, narratives *and* grand narratives are a source of critique and, in some cases, scorn for those persuaded by colonial, empirical, and hegemonic notions of the past. On the other hand, grand narratives still thread through the world we inhabit, whether it be economic doctrine, political ideals, or identity formation. My analysis proceeds from the position that grand narratives do indeed continue to perform significant cultural work, despite Lyotard's critique. The conclusion of

this chapter will examine how the grand narrative presented in *Cosmos* positions itself as addressing the existential concerns that critics of grand narratives have identified.

Cosmos was not the first science narrative to weave natural knowledge into a grand narrative form. As mentioned in Chapter One, the Epic of Evolution, as it is presently known, preceded *Cosmos*. However, before exploring the Epic of Evolution, we shall endeavour to scope out texts that predate the mid-19th century, keeping in mind the tenets of the Complexity Principle, to provide the proper contextual background leading into the 19th century and the spread of literature through books and periodicals. In the following section, we shall explore the beginnings of natural knowledge as being sufficient for explaining the world as a grand narrative. We will start with Francis Bacon and proceed into the German tradition with the *Naturphilosophie* of Friedrich Schelling.

Proto-Grand Narratives of Science

Science occupies a unique space by being virtually entirely legitimized by the knowledge produced by the practices of natural historians, philosophers, and now scientists. That science has been as successful as it has over the last 400 years, bringing us everything from electricity to radio to sending spacecraft beyond our solar system, is a testament to the power and stability of the methods that harmonize what is referred to as “science”. These methods, though varied and challenging to universalize in great detail, will almost certainly involve what can be classified as observation and hypothesis testing. This basic formula for research on nature was legitimized in the Western canon by Sir Francis Bacon (1561-1626) in his seminal work, *Novum Organum, sive Indicia Vera de Interpretatione Naturae*, or, *New Instrument, or True Directions Concerning the Interpretation of Nature* (1620). In it, Bacon outlined what has become known simply as the ‘Baconian Method’, which was the primary influence on the process by which science operates today.

Critically, what Bacon claimed was that the reach of inductive reasoning through his new scientific method was virtually everything. Bacon writes,

> It may also be doubted (rather than objected) whether we are speaking of perfecting only Natural Philosophy by our method or also the other sciences, Logic, Ethics and Politics. We certainly mean all that we have said to apply to all of them, and just as common logic, which governs things by means of the syllogism, is applicable not only to the natural sciences but to all the sciences, so also our science, which proceeds by *induction*, covers all. ([1620] 2008: 98)

In other words, Bacon asserts that knowledge derived from the new methods of science (and not only from science itself but all avenues that generate knowledge) can offer new knowledge that is useful for all the fields of human inquiry and practice. For some, the consequence of this thinking is that Bacon is arguing for what is now called scientism.

Scientism is often contrasted with religion (Boudry and Pigliucci 2017) as a belief that puts science, and all that it is and offers, as the primary (and often only) source of knowledge, with the legitimacy and authority to ensure human success. Eric Voegelin, a German-American social philosopher who wrote prolifically on social and cultural subjects, was influenced by his flight from Germany after the Nazi Party seized power and made its intentions clear. Influenced by his experience leaving his homeland and by what he witnessed during and after World War II, Voegelin formulated the basic tenets of scientism that scholars use today to identify scientistic thinking. He wrote that scientism is,

> categorized by three principal dogmas: (1) the assumption that the mathematized science of natural phenomena is a model science to which all other sciences ought to conform; (2) that all realms of being are accessible to the methods of the sciences of phenomena; and (3) that all reality which is not accessible to sciences of phenomena is either irrelevant or, in the more radical form of the dogma, illusionary. (Voegelin 1948: 462)

Principles two and three, especially, make clear both the assumptive beliefs of the scientific endeavour necessary for making science a worldview encompassing the full ontological status of being and the possible relationship between scientism and religious faith upon further inquiry. This last point is especially relevant for our purposes.

The Abrahamic faiths—Christianity, Islam and Judaism—have played a substantial role in establishing knowledge systems that have shaped the world (Anderson 1983, Taylor 2007, Harrison 2015, Keel 2018). The calendar is a simple yet effective representation of the power that religion has over the movement and organization of bodies through space and time, informing practice, creating meaning, and instilling a shared cultural connection among observers. Religious notions are pervasive in our language, uttering "oh my god" in reaction to surprise or exclaiming "Jesus" when shocked. It informs our legal and political ideals, with God written into the legal documents of most Christian-formed nations. The reason for this is simple enough to understand. Over a thousand years of Christian dominance in the European North Atlantic world, much of that time with Christian leaders in positions of absolute or near-absolute power, has rendered the historical record replete with religious influences. This, in turn, influences people's thoughts and practices, establishing norms and ways of being that normalize the cultural conditions of (in this case) Christian influence. Christianity is therefore systematically embedded in the cultures of the North Atlantic world.

Such systemic influence also legitimizes some knowledge while dismissing or altogether ignoring others. Like scientism, the Christian-established worldview may dismiss that which cannot be reconciled with its own epistemic orientations. Such was the case with other religious or spiritual knowledge—virtually anything outside of the cultural norms of the heterogeneous Christian value set. This is apparent from the attempted Christianization of Canadian Indigenous peoples, the enslavement of Africans, or any other number of atrocities committed in the name of God and country. Scientism is then not unlike this Christian

dismissal. It, too, finds untestable, unobservable, and unquantifiable claims to be unworthy and unsubstantiated.

In dismissing anything that falls outside the investigative jurisdiction of science, scientism establishes what amounts to a grand narrative about how the world is and how one can know it. Scientism legitimizes what can be known and what cannot, and therefore what is legitimate and what is not. Christian theology and belief, for example, begin from the fundamental premise that God *is*. Since this is inscrutable to scientific inquiry, religious thought is therefore void, at least to those who adhere to scientism, but also to Atheists, Humanists, Logical Positivists, and the like. What pushes scientism to an 'ism' is that it becomes an absolute to forgo any knowledge that cannot be processed via scientific means and to embody the conclusion that all knowledge is to be only naturally derived. This has consequences for the practices of people who represent such an ideology and, more crucially, for the world of the subjective, internal self. It effectively delegitimizes the "phenomenology of spirit" outlined by Georg Wilhelm Friedrich Hegel (1770-1831) in 1807, and everything that follows from it, as a means of comprehending reality.

Over a century after Bacon and those early (and modern) ideas of scientism, the German Romantics like Johann Gottlieb Fichte (1762–1814) and Johann Wolfgang von Goethe (1749—1832), who was a mentor and close friend of Alexander von Humboldt (1769–1859), were thinking through, among other things, Nature, science, art, music, poetry and philosophy. The idea of the subjective view of nature was coming into dialogue with the objective reality of nature in ways that emphasized the "pure I", the experience of nature and knowing it, which was motivated by a Kantian reinterpretation (Breazeale and Zöller 2005: xi). This potent combination starkly contrasts with Bacon's utilitarian assertions that the method of science is the only legitimate means of securing knowledge. The Romantics struck back against what they perceived as the mechanistic and reductionist approach to knowledge,

an approach that stripped the thinking, feeling human out of the world. Among these radicals' ranks was one Friedrich Wilhelm Joseph von Schelling (1775-1854), who wrote the treatise that expanded the work of Fichte to encompass an entire philosophical framework of nature. Schelling's grand work was *Ideen Zu Einer Philosophie Der Natur*, or, *Ideas for a Philosophy of Nature* (1797), which outlined the most systematic and complete conception of *Naturphilosophie*—a philosophy of nature in a grand-narrative sense.

Naturphilosophie outlines some key tenets that were both a response to the Baconian school and an advancement of the Romantic spirit of the time. With the Baconians advocating for a utilitarian and materialistic-only approach to nature and understanding it, the Baconian method was simultaneously a sophistication of the Christian notion of man separate from, and having dominion over, nature; Bacon writes early in the *Novum Organum*, "Let the human race only be given the chance to regain its God-given authority over nature, then indeed will right reason and true religion govern the way we exert it" ([1620]2008: 197). Bacon fashioned his new science to bring the human race into proper order with Divine will, by renewing the commitment outlined in Genesis of dominion over "the fish of the sea, and over the birds in the air…and over every creeping thing that creeps upon the earth" (Coogan 2010: 13). However, this was perceived as alienating from nature, as dominion still implied, in the minds of the German Romantics, power and separation over and from nature; and with the first signs of world defining changes from industrialization, and the increasing growth of cities as the few viable places for work, the Romantic movement began to look at nature as more than a thing that can be known and controlled, but as a thing that is, as Kant would outline, an end in itself—something to live in harmony with.

For our purposes, three essential tenets of the Romantic view of nature are organicism, the dynamism of natural processes, and the unity of the nature spirit. These tenets are expressed throughout Schelling's *Naturphilosophie*, but the first two share some

commonalities, so I will address them together first. Organicism and the dynamic processes of nature were responses to developments in natural history swirling through learned circles at the end of the 18th century, which we today refer to as transformism. As technology developed, allowing for empires to reach "strange new worlds", such as more accurate means of navigation from John Harrison's marine chronometer, gentlemen companions for captains of sailing vessels were increasingly being selected as a means to bring greater prestige to the monarch of the departing nation. Natural knowledge became, in a certain sense, a currency among late 18th and 19th-century nations, as ideals of nationalism became bound to developments in natural history. Some of the most celebrated natural historians recognized today, such as Halley, Darwin, and Humboldt, to name but a few, made their names through the collections, journals, and theories developed from their time sailing across the globe because of the need for empire building.

The 'discoveries' made during the 18th and 19th centuries by these gentlemen companions of natural history brought the 'new world' and its fantastic flora and fauna to the 'old world', giving people opportunities to witness and reflect on the similarities and differences between, say, beetles in New Grenada (Venezuela) and those in Germany. The British Museum, dating to 1753, is a testament to this, with the rise of collections from wealthy collectors and naturalists coinciding with the rapid expansion of the British Empire. Further adding to this was the more local practice of fossil hunting, which was fashionable in the 18th and 19th centuries. Remarkable discoveries of ancient fossils of giant creatures like the woolly mammoth and smaller marine animals revealed eerie similarities with present-day species. With these developments and the increased availability of and increased access to notes, texts, and collections from around the world, ideas of a commonality among flora and fauna began to flourish. The likes of George-Louis Leclerc, Comte de Buffon (1707-1788), Erasmus Darwin (1731-1802), Jean-Baptiste Lamarck (1744-1829), and Georges Cuvier

(1769-1832) are all examples of writers who reflected on, in one way or another, the change of species over time.

The German Romantics were also influenced by this growing view of nature, adopting ideas of transformation over time, common ancestry, environmental pressures, and the unity of the Cosmos through universal principles or processes. Schelling wrote this explicitly in his *Von der Weltseele*, or, *On the World Soul*, of 1798 (Richards 2002: 300). He wrote one of the most complete accounts of this view of nature. For Schelling, the "world soul" was the unifying principle that drove all of nature, uniting both organic and inorganic matter together into a dynamic process that he called "evolution", predating the term now associated with Charles Darwin (Richards 2002: 298). The world soul was the revelation that the Divinity of nature, removed from theistic interpretation, was revealed from these unifying and dynamic processes.

In Schelling's *Naturphilosophie*, he strives to develop a complete system from the smallest to the largest, from the abstract to the concrete processes of Nature. For Schelling, Nature is us, and we are it. For "Nature should be Mind made visible, Mind the invisible Nature…the problem of the possibility of Nature external to us must be resolved" ([1797] 1988: 42). Committed to philosophy as "an absolute science" which "cannot itself in turn be a subordinate to science" ([1797] 1988: 44), Schelling questioned the validity of relegating questions of Nature to God. As noted above, the Romantic motivation was in part a push back "against the empirical realism" ([1797] 1988: 43) of Bacon, but also a view that when "the human spirit (still youthful, vigorous and fresh from the gods) had lost itself in mythology and poetic fictions about the origin of the world…founded on that conflict between spirit and matter" ([1797] 1988: 15) we lost the ability to question the world around us.

This connects directly with the third tenet, in that the world soul, as the Divinity of Nature, connects all of life, matter, energy, and force. Schelling wrote about many natural

phenomena, like electricity, combustion, opposition, and attraction, all reflections of the Divine—the world's soul. In being all-encompassing, the world soul is the bringer of all things, similar to God, and because there is one source for all things, all things are connected. This meant that human beings, too, are related to the Cosmos as we are made of that same matter. Mind and Nature are one; they are not separate. From this, the question of the material origins of life and the Cosmos follows. If the world soul was conceptually an abstraction of, or like, God, then we are thus an expression of that sacred power, connected to the Divine Nature of all the Cosmos. The *Naturphilosophie* is the material claim made whole.

This is the strongest point of differentiation between scientism and *Naturphilosophie*, as the dynamic, moving, organic, connected concept of nature, housed within the Romantics' ideals of harmony between humanity, nature, art, poetry and more, is much more fruitful for human flourishing compared to dominion over all, rigid empiricism, and the subtraction from the subjective world. While scientism dissuades from the creative possibilities of a relationship with Nature grounded in subjective desire for connection, *Naturphilosophie* welcomes them. This development is critical for understanding the profound shift that occurred, which eventually led to *Cosmos* becoming a cultural phenomenon more than two centuries later.

The Epic of Evolution

While *Naturphilosophie* and scientism have grand-narrative elements, they do not fully qualify as grand narratives. They both have all-encompassing knowledge beliefs, a premise itself that requires faith; they may organize human practice around naturally derived meanings and values; they may even inspire, but one does so from the purview of epistemology, from the perspective of understanding and making claims about knowledge. The other wants to prescribe an antidote to what it finds meaningless through philosophical

and artistic treatises. It is still missing the most basic element of *narrative*—a story. This is where the Epic of Evolution comes into our discussion.

Before diving into the background of the Epic of Evolution, it is crucial to unpack the work that motivated the Epic to begin with: Charles Darwin and his *On the Origin of Species.* Charles Robert Darwin (1809–1882) was born into a prosperous, artistically and scientifically active Shrewsbury family. Darwin's grandfather, Erasmus, would become known as one of the pre-Darwinian thinkers. Sent initially to University of Edinburgh to study medicine like his father, he was later sent to Christ's College, Cambridge, to become a clergyman, reading William Paley's works on natural theology, while pursuing his passions in the field with the botanist John S. Henslow (van den Brink & Cook 2019: 27). While Darwin had committed himself to a life as a country parson, he simultaneously committed to the role of naturalist aboard the *Beagle* even though he knew it may have been "Disreputable to my character as a Clergyman hereafter" (van Wyhe 2002). After some persuasion of his father to allow him to go, offering "objections quite fairly & fully" (Darwin Correspondence Project, "Letter no. 111"), Darwin was able to be the gentleman companion to Captain Robert FitzRoy (1805-1865) and travelled with him on the five-year voyage aboard the *HMS Beagle* (1831–36). Inspired by Alexander von Humboldt, especially his *Personal Narrative of Travels to the Equinoctial Regions of America* (1814), Darwin wrote meticulous geological notebooks and coral-reef papers that placed the young naturalist "in the very first rank of British scientists," foreshadowing the evidential standards of his later evolutionary work (Ruse 2009: 18). His early writings revealed a thinker drawn to explanatory "laws impressed on matter," a phrase he used that "endorsed unbroken natural law as the sole means of the 'production and extinction of the past and present'" (Dilley 2012: 48).

Moving to Down House in 1842 from their cramped London flat, Darwin wrestled with chronic illness but sustained a prodigious research and communications programme: *On*

the Origin of Species in 1859, a sequel of sorts on human descent in 1871, a book on earthworms in 1881, and over 15,000 letters during all this time before his death the following year in 1882. All the while, Darwin's view of religion moved from conventional Anglicanism toward what he late in life called an "agnostic" with perhaps some view of a personal God removed from nature—"in my most extreme fluctuations I have never been an Atheist," he wrote in 1879 (van den Brink & Cook 2019: 31). Darwin still inserted "by the Creator" into the second edition's entangled-bank peroration to signal continuity with natural-theological conceptions of law (van den Brink & Cook 2019: 29). The tragic grief of the death of his daughter Annie in 1851, deepened his sensitivity to natural suffering and unsettled earlier certainties of his long-established Christian faith, moving his beliefs instead to something more personal and less omniscient, and omnipresent (van den Brink & Cook 2019: 30).

His most outstanding achievement, and the work in question for us here, is his *On the Origin of Species*. While the title Epic of Evolution may often lead back to Darwin, Darwin never used the word evolution in his original work, instead using the verb "evolved" as the last word of the book (Darwin [1859] 2009); 'evolution' was absent until the sixth edition of the book in 1872, as it had originally been used for the development of embryos and Darwin was quite careful with his word choice (Browne 2002: 59). Regardless of his careful selection of words, some contemporary scholars label *Origin* as "the last great work of Victorian natural theology," given the less forceful introduction of a systemic and complete account of natural selection on offer. Instead, these scholars claim that *Origin* is a scientific brief stitched to a theological tradition rather than the far-reaching scientific treatise it became (van den Brink & Cook 2021: 27). Darwin's focus was on organic-material systems from a historical perspective, not on the generation of a grand narrative myth. For example, near the end of *Origin*, Darwin declares that life's history "accords better with what we know of the

laws impressed on matter by the Creator" (Darwin [1859] 2009: 425-426), underscoring a natural theological-rational tone rather than a heroic narrative arc based on evolution. Even the celebrated "Tree of Life" simile, as Michael Ruse points out, borrows a familiar Christian image but only to illuminate a strictly natural mechanism, not to spin an origin-story epic (Ruse 2009: 222).

However, as I outlined in Chapter One, the Epic of Evolution expands beyond Darwin; as Lightman aptly puts it, "Although Darwin is important for the construction of the evolutionary epic after 1859…he was not the decisive influence" (2007: 222). In the wake of Darwin's work, the Epic of Evolution did not appear in print until after the term "evolution" had caught on. While popularized by Herbert Spencer (1820-1903), the term had been used with some frequency since at least the 17th century, with records of "evolution" in a *relatively* modern way appearing in the review of *Historia Insectorum Generalis* (1669) by Jan Swammerdam and Heinrich Chirstian von Hennin in the fifth volume of *Philosophical Transactions of the Royal Society* in 1670 (p.2078).[9] Appearances began ramping up in the 19th century as the pre-Darwinians wrote on evolution-adjacent topics, and then with Darwin's work, culminating in Spencer's more prominent popular usage in *A System of Synthetic Philosophy - First Principles* in 1862, advocating for a wide, all-encompassing evolutionary framework, the seeds were sown for the Epic of Evolution to appear.

However, Allan Megill, historian at the University of Virginia, argues that there are two versions of the Epic of Evolution: an idealist version and a materialist version (2016: 29). These two versions map reasonably onto what Lightman labels as "the religious and the secular" (2007: 222) versions of the epic. The differences in these historical examples are pretty straightforward from their titles, and I will get to examples of them soon, but it is worth diving a little deeper into this distinction and the history of the epic. For one thing, the

[9] *Philosophical Transactions* October 1670, Vol.5, 2074-2082

Epic of Evolution had been dormant for most of the 20th century, with reference to "Epic of Evolution" or "evolutionary epic" appearing sporadically, like in a 1953 LIFE magazine special collection on "Two Billion Years of Evolution" (Barnett: 59). In the context of LIFE magazines' usage, it is critical to note that the usage is not implying a grand narrative form, only a play on words for aesthetic and journalistic purposes, but this raises an important component of this history.

The grand narrative form, Megill (2016) and others have argued (Secord 2000), emerged in 1844 from Robert Chambers (1802-1871), a Scottish publisher, co-founder and partner of W. & R. Chambers Publishers. Robert Chambers and his brother William (1800-1883) would produce some critical works of the time, like the *Chambers's Edinburgh Journal* (1832-1956) and the *Chambers's Encyclopaedia: A Dictionary of Universal Knowledge for the People* (1859-1979). In the *Encyclopaedia*, an entry on the "Epic of Evolution" appears in the 1889 edition, with reference to "Goethe's Epic of Evolution" (481) in reference to Goethe's *The Metamorphosis of Plants* (*Versuch die Metamorphose der Pflanzen zu erklären*) of 1790. Again, however, the question of meaning being deployed by the contributors to *Chambers's Encyclopaedia* is essential. Goethe's work is impressive but limited to the flora he observed on his trip to Italy from 1786 to 1788. This suggests that Chambers and those who worked at his publishing company were at least aware of the elements that would contribute to an epic predicated upon evolution: organic development from one form to another and applicability to wider ranges of organic objects. The German Romantic influence from Goethe, which flourished from the 18th to the 19th centuries, would also hint towards moral and worldview-informing axioms. I will return to the German Romantics again shortly. Still, their *Naturphilosophie* would play a key role in the development of the Epic of Evolution, which becomes critical for the narrative form of the Grand Cosmic Narrative I am building towards. We are now closer in meaning to the target

than before, specifically by using the terms of both Megill and Lightman, both of which are idealistic *and* secular.

Fast-forwarding to the 20th century, another key development of the term was its reintroduction and framing by Edward O. Wilson (1929-2021) in 1978. A Harvard University evolutionary biologist specializing in entomology who studied ants, Wilson imagined a possible world in which the findings of science would be crafted into a cohesive, all-encompassing whole that would offer the same epistemic and subjective substance as myth, but grounded in the empirical findings of scientific investigation—a secular myth. It would be easy to assume that Wilson's Epic of Evolution was juxtaposed with Christian Scripture, but Wilson's view was complex. Raised in Alabama in a strong Baptist family, Wilson moved away from the Church during his school years. He would argue that religion was a product of evolutionary forces, as he did in his most controversial and famous work, *Sociobiology: The New Synthesis* (1975). Here, he argued that religion positively influenced human survival for most of history. But he felt organized religion had been outgrown, and that to be environmentally advantageous in a world of science and technology, globalization and potential environmental disaster, a new myth, a new set of values were required.

While Wilson had amassed a series of controversies during his lifetime over his extension of evolutionary thinking to the human condition, especially from sociologists, his idea of the Epic of Evolution was relatively new in the landscape of humanities scholarship on science. In Wilson's description of the epic, he outlined, like the tenets of scientism, that all knowledge would be naturally derived, including social and psychological premises, and that the universe—and thereby everything in it—is subject to similar, consistent, natural rules—here, evolutionary processes. But "every epic needs a hero: the mind will do" (Wilson 1978: 202). Martin Eger, a physicist and philosopher of science, wrote on "a new epic of science" and spends much of his chapter in *The Literature of Science: Perspectives on*

Popular Science Writing addressing Wilson's 1978 work and the Epic of Evolution as "obvious and rather serious" (1993: 190). Eger compares the Epic Wilson outlined to Jürgen Habermas's hermeneutic work, concluding that "much depends on how these grand myths of science are appropriated, how they fit in with the whole cognitive ecology" (1993: 203). This language-based approach to the Epic of Evolution was perhaps unintentionally taken up by theologians, natural and social scientists, and humanities scholars, probing the space between science and religion as they began to create or discuss this emerging genre in systematic fields of study and academic organizations, like David Christian, creating the field of Big History. The Institute on Religion in an Age of Science (IRAS) held the first known recorded event on the Epic of Evolution in the summer of 1996 at their customary venue of Star Island, with the likes of Eric Chaisson, Terry Deacon, Ursula Goodenough, Gordon D Kauffman, Brian Swimme, Berry Thomas, Mary Evelyn Tucker, and Loyal D Rue. Then, in 1997, the American Association for the Advancement of Science's (AAAS) Dialogue on Science, Ethics and Religion (DoSER) group held a conference on the Epic of Evolution at the Field Museum in Chicago in November 1997, bringing together this wide range of scholars from across America and the world, which included nearly all the scholars from the IRAS conference and others like John F Haught, Ronald L Numbers, and almost 300 others.

The Epic of Evolution piqued the interest of historians of science. James Secord, Emeritus Professor and Director of the Darwin Correspondence Project at the University of Cambridge, was the first historian of science to use the term "evolutionary epic" (2000: 19), motivated by Eger's discussion (1993) and the late philosopher Michael E. Ruse's (1940-2024) work on the idea of progress in evolution, which included an interview of E O Wilson and a discussion of the Epic of Evolution which Ruse describes as a "secular faith" (1996: 516). In the wake of these discussions, conferences, and books, historians were now attuned to the concept of grand narratives in science from the macro to the micro; historians found

early examples of such an evolutionary narrative epic throughout the 19th century. They began piecing together a genealogy of these narratives that explained life in naturalistic terms from the growing reading public of the 19th century British Empire to the present, with the likes of David Page (1814–1879), Arabella Buckley (1840–1929), Edward Clodd (1840–1930), Grant Allen (1848–1899), Richard Dawkins (1941-), and others using it. The most notable historical example of the Epic of Evolution is *Vestiges of the Natural History of Creation.*

Robert Chambers anonymously authored *Vestiges of the Natural History of Creation,* which was published in 1844 and aimed at the English public. The text was massively popular and widely discussed, covering the broad sweeps of time and space that then-modern geology, astronomy, and other natural philosophies and histories could reveal. While today the text may appear as a more serious reflection of the works of science of the time, for the Victorian reader, the book would have been an accessible read that brought the novelties of the researches of the natural world, developing so quickly at that time, to life in a synthetic, linear narrative form.

Selling over twenty-four thousand copies by 1860 and having thirty-three editions by 1890, *Vestiges* was a commercial success (Lightman 2007: 33). The practice of anonymity, while not entirely unusual for Victorian readers before 1870, caused a great mystery around the book, given its contents, creating a stir with speculations on who the author could be (Secord 2000: 371). Crucially, however, *Vestiges* marked, along with its explanatory sequel *Explanations: A Sequel to "Vestiges of the Natural History of Creation"* (1845), the first major commercial success to put forth an evolutionary, natural development of the Cosmos and everything that constitutes it. Secord uses the term "sensation" deliberately, claiming it "came to mean an excited or violent emotion felt by an entire community and produced by a common experience" that would be tied to "'vulgar,' 'noisy,' and 'popular'" (2000:12). In the

later chapters of *Vestiges*, Chambers wrote on the development of human beings, asking readers if "our race [is] but the initial of the grand crowning type? Are there yet to be species superior to us…" (Chambers [1844]1994: 276). Humanity, it could be inferred, was not placed on Earth in its current state by God's hand but instead developed from lower species over unimaginably long periods of time, adapting to their respective environments, directly challenging Scripture and the teachings of the Church. This, among other challenges, caused some controversy among the Victorian public. A 'sensation' indeed, and this was perhaps part of the rationale for the anonymity.

As Secord claims, *Vestiges* is the template from which the 'evolutionary epic' took form. In *Victorian Sensation*, Secord's magnificent social and intellectual historical analysis of *Vestiges*, his goal was to broaden the understanding of *Vestiges* by offering "geographies of reading" (2000: 156), suggesting "that the most abstract ideas about nature should be approached first and foremost as material objects of commerce and situated in specific settings of reading" (4). Secord argues that the adoption and interpretation of the book in Manchester or Liverpool (working-class industrial towns) would differ from the interpretations in Cambridge or Oxford (centres of higher learning). In using this approach, Secord draws out differences to demonstrate how groups in different locations reacted differently to the book, based on their social, cultural, and geographical contexts. More than this, Secord offers a critical engagement with the text in the broader Victorian context, providing "a book about evolution for the people, and the evolving self-identity of 'the people'" (2000: 5).

Secord uses 'sensation' both as the book's title and as an apt descriptor of the kind of cultural impact *Vestiges* had. As I explained above, Secord shows how the meaning of 'sensation' underwent a series of changes from the 18th to the 19th centuries, connected with the aftermath of the French Revolution (2000: 11). The English were frightened by the

political, philosophical and social implications of the French Revolution, seeing the sensationalized writings of the French intelligentsia as the underpinning reasons for the bloody and status-disturbing social uprising that occurred beginning in 1789. Indeed, *Vestiges* created an 'excited emotion' felt across the entire United Kingdom, being both popular and noisy. When the book was first published in 1844, it came at a time when Britain was undergoing a transformation in communications, a revolution that brought with it new forms of distributing information, such as newspapers and modern journalism, the penny press, new print technology, and faster and cheaper access to books, even for members of the working class (Secord 2000: 24).

Another critical part of the sensation of *Vestiges* was the religious implications with which the book was associated. *Vestiges* was caught up in debates about the creation of the world, its inhabitants, the design of nature, and God's involvement in the world, among others. Furthermore, the moral implications associated with a naturalistic and materialistic understanding of human beings and the world meant that many, such as William Buckland (1784–1856), Adam Sedgwick (1785-1873) and William Whewell (1794–1866), were critical of the book (Secord 2000: 134-136). Fears that *Vestiges* would cause, or had already caused, a reduction in belief in the divine rule of God and His inspiration as revealed in Scripture were very real after *Vestiges'* release.

As Secord reveals in the first chapter of *Victorian Sensation* (2000), among the learned community, reviews of *Vestiges* ranged from overwhelmingly positive (*Edinburgh Review* 1845) to critical of its overall thesis (*Athenaeum* 1845) to damning (*Bosanquet* 1845). The mid-to-late 19th century was a time when the professionalization and boundary work for what we know today as the various disciplines of science was occurring. Disciplines were being walled in, science was becoming increasingly focused exclusively on the natural world, and scientists, coined by William Whewell in 1833, were moving out into the spaces of

learning and industry rather than remaining in their well-equipped, wealthy homes. Secord argues that much of the controversy surrounding *Vestiges* was a result of this text coming into contact with the proponents and general cultural attitude of professionalization (2000: 530). Further, natural theology, the philosophical position of observing nature to bring about a greater understanding of God, which was on the cusp of becoming out of fashion, had been *the* framework from which to think about nature. Indeed, many of the critical voices mentioned above were natural theologians.

Many of the natural theologians targeted their criticism towards the evolutionary implications of Chambers' general thesis. Chambers put forth a 'development hypothesis' which, according to Chambers, is "the principle which has been immediately concerned in the peopling of this globe, a process extending over a vast space of time, but which is nevertheless connected in character with the briefer process by which an individual being is evoked from a simple germ" (Chambers 1994: 202-203). This clearly foreshadows Darwin's *Origin* in general outline—that all life originates "from one stock, which was at first in a state of simplicity" (Chambers 1994: 305). This challenged the narrative of Genesis and the understanding that humanity was created in God's image. If life is a materialistic and natural process of development over long periods of time, then what does it say of the church, human morality, or even the soul?

But, oddly enough, Chambers was unwavering in his commitment to natural theological principles and dedicated his entire last chapter to confronting the reader with assurances as to why this theory is not at odds with God's work. If evolution were to be portrayed as a teleological process, then it could be reconciled with the Christianity of the Victorian public. Presenting a moral philosophy predicated upon his development theory, Chambers argues that God "established the laws for the operation of inanimate matter, which are quite unswerving, so that when we know them, we have only to act in a certain way with

respect to them, in order to obtain all the benefits and avoid all the evils connected with them" (1994:376). God set the universe in motion, and by discovering the laws of nature, humanity can live in accordance with them for the betterment of all. While today we may see this as being resolutely natural theology, this was another critical reason for the sensation that *Vestiges* created.

While this brief history of *Vestiges* offers the text's role in the past, its influence in the future is vital to us here. As I have stated above, according to historians of science, the Epic of Evolution became popular with *Vestiges*. The first chapter situates the reader in a friendly manner on a voyage through the solar system. Chambers utilizes the most up-to-date astronomical data to establish the grandest scale possible at the time, deploying the Nebular Hypothesis. The Nebular Hypothesis was only just gaining scientific credibility due to William Herschel's (1738-1822) double-star discoveries using his self-designed Newtonian telescope, which brought the reader's attention to a much larger and grander idea of Creation, breaking free from the limited scope available to human senses. Chambers utilizes relational language here to bring the reader into the universe that science reveals: "man pauses breathless at the contemplation of a subject so much above his finite faculties, and only can wonder and adore" (1994: 26). This reminds the reader that God is infinite and cannot be dampened by human understanding, even though we may be uncomfortable with the contents discovered by nature—such discoveries only serve to prove God's majesty and greatness further.

By beginning *Vestiges* with an immense scale established by astronomical matters, Chambers then proceeds to detail the 'deep time' of planet Earth using the geological record. Geology is the primary discipline of natural history that Chambers adopts, with many of the chapters in the books having geological titles, such as "Constitute Materials of the Earth," The Earth Formed," and "Era of the Old Red Sandstone," to name a few (1994). Through the

geological record, Chambers develops his theory, proceeding in chronological order. Chambers begins with the geological forms of ancient Earth and moves through each era, associating new animal and plant forms with each era. Over the course of the book, Chambers situates life, including human life, within a natural 'development', drawing on the sciences to synthesize them into a cohesive narrative whole about life on Earth, moving from the cosmic to the geological and weaving the biological throughout.

The hallmarks of the evolutionary epic, as outlined in the introduction, were popularized with *Vestiges*, and such a narrative form is appropriate given the milieu of the time. Evolutionary writings became increasingly common during the 19th century. Alfred R. Wallace (1823-1913) wrote to Darwin with a similar outline of natural selection, which urged Darwin to go to print, suggesting that evolutionary theory may have been inevitably uncovered (Bowler 2013). However, the argument *Vestiges* attempted to make was that if the materials of the Cosmos are composed of matter that developed over long periods of time, and the fossil record indicates a development of animals and plants over long periods of time, then life on the planet Earth has changed form over these long periods to become what is visible today.

The hallmark of *Vestiges*, however, was the introduction of a developmental theory to the Victorian English public. Adrian Desmond, in his *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (1992) argues that evolutionary thinking was imported from the French anatomists, like Étienne Geoffroy Saint-Hilaire (1772-1844) and Jean-Baptiste Lamarck (1744-1829), to universities like London University (now known as University College London), where "radicals" took "the new French approaches to comparative anatomy," which to them "symbolized progress and expertise" (Desmond 1992: 30). These radicals, young men in the University College Hospital medical school established in 1834, and their ideas from the French were associated with working-class radicalism and

"despised the Whigs' Poor Laws" (Desmond 1992: 31). For a class-obsessed English society, arguing for an egalitarian British society made evolution a political hotbed, rendering the middle and upper classes afraid of evolution because of its radical social implications.

Chambers removed those fears by "domesticating" evolutionary theory so that middle and upper-class readers could accept it. As Desmond so colourfully puts it in his *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (1992), "Remember that in 1830, at the time of the July Revolution in Paris, the Anglican elite in Britain was staving off concerted attacks by the radicals attempting to secularize and democratize their own society. Creationist politics were bound to be fierce in an age when French rationalist theories threatened the old subservience on which the ruling class's security depended" (2). Desmond's argument from power situates *Vestiges* as antithetical to the "evolutionary sciences openly imported from France into Britain" (ibid.). While still causing a "sensation", it nonetheless was tempered by being a book on the "comprehensive 'science of progress,' focused on development and gradual change" which appealed to the rapidly growing middle classes (Chambers 1994: xiv).

The success of *Vestiges* and the stir it caused amongst the Victorian public was something others wanted to replicate. As such, two significant developments that concern us here began to flourish: the evolutionary epic and the popularization of science. While elements of science popularization had been in print since the middle of the 18th century, this must be couched within the means of the period, meaning that only the wealthy, who could afford books and could read, would learn about cutting-edge scientific knowledge. But by the latter half of the 19th century, when printing was rendered cheap enough to allow members of the middle and working classes to read, and more books to be printed, in the wake of *Vestiges*, science popularization books took off as an economically lucrative industry (Lightman 2007, Papanelopoulou 2009). Accompanying this was the rise of public lectures

and theatre shows, which were increasingly popular. Many of the scientific and technological developments of the time were presented in spectacles that stimulated the senses. This includes those by Michael Faraday at the Royal Institution, beginning in 1825 on Christmas, for the children of London. This wasn't just confined to the United Kingdom either. In Germany, coming in at the end of the German Romantic period, the naturalist, writer, and political activist Alexander von Humboldt (1769-1859) released, over the latter years of his long life, the multi-volume epic, *Kosmos: Entwurf einer physischen Weltbeschreibung*, or, *Kosmos: Sketch of a Physical Description of the World* (1845-1862).

Kosmos was inspired by the thinkers of the German Romantics, with Humboldt having a close relationship with the poet and writer Johann Wolfgang von Goethe (1749-1832), from whom he learned much and with whom he shared in scientific experiments (Wulf 2015). Humboldt, equipped with the teachings of one of the Romantic greats, went on a journey, not unlike Darwin's, of five years between 1799 and 1804 with the Spanish frigate *Pizarro* and his botanist companion Aimé Bonpland (1773-1858) after receiving royal consent from King Charles IV (1748-1819). Aboard the *Pizarro*, Humboldt made stops across the Spanish colonies of the "new world," and even stopped in the newly established United States of America, where Humboldt was eager to visit because of their libertarian ideals of freedom and equality. Humboldt even became an acquaintance of Thomas Jefferson, though Humboldt was quite critical of America's and Jefferson's maintenance of slave ownership (Wulf 2015). Years later, after Humboldt had returned to Europe and moved between Germany and France, lecturing, inspiring, and writing to leaders of revolutions in South America, he began to take his lifetime of collections, notes, and ideas and translate them into the connected historical narrative of *Kosmos*.

As a student of Romanticism, Humboldt's *Kosmos* was an attempt to bring the lessons of *Naturphilosophie* to bear in the written work of a naturalist. Humboldt's objective was to

show how “all the forms and the forces of nature may be contemplated in intimate and living connection” (2010: 40). Having amassed a vast collection from his voyages, travels, and contacts, Humboldt was able to use them to infer a shared connection among plants and animals, an argument that would be woven throughout *Kosmos*. As a result of the idea of a universal shared connection, Humboldt was a staunch critic of a materialist conception of nature. Instead, Humboldt believed that nature revealed the inner world of thought. In building knowledge about the natural world, one would simultaneously be uncovering aspects of the human mind that were already there; as Humboldt writes, “A bond connecting the outward world of sense with the inward world of thought may be here perceived; the two become unconsciously confounded, and the first germ of a philosophy of nature is developed in the mind of man without the firm support of observation” (2010: 16).

Throughout his travels, Humboldt encountered many peoples in “savage nations” that confirmed his suspicions about the “germ of a philosophy of nature”. What Humboldt referred to as “firm support of observation” is in accordance with what Bacon put forth in his *Novum Organum*. Here, however, we have a softening, an openness, that only a romantic naturalist of the German tradition could inspire. Humboldt refers, of course, to hypothesizing and testing, and to arriving, through induction and observation, at verifiable and justified beliefs. The “savage nations”, which Humboldt maintained had the requisite knowledge for survival, were ignorant of the mechanisms of whatever naturally occurring thing was in question—this was the benefit of science.

However, the mechanisms and systems of nature, for which the tools of science provide the means to know them, are part of a larger context—a Cosmos (in the true definition of the term). Humboldt found that Indigenous peoples create myths and stories about the mechanisms of nature, providing explanatory frameworks for the phenomena in question, and gathering the data needed to survive, build culture, and endure. Humboldt

believed they were grasping at something greater, and Humboldt believed that science could bring everyone closer to that greatness. While greater-ness may first appear as only knowledge derived from scientific means, it would be missing the importance of the above quote and its equalizing of the 'inner world of thought' with the 'outer world of sense.' Instead, we should take away from Humboldt's worldview and writing that the Indigenous were *already* attempting what Humboldt believed science could do, too: creating a Cosmos in which the external world of nature and the internal world of thought reflect one another. This, in turn, would endow purpose to natural knowledge, meaning to the pursuit of it, and definition to the lives of everybody.

The German Romanticism woven into *Kosmos* is a critical defining feature of this early narrative. Like *Vestiges*, it was situated within the transformist thinking that was a prelude to Darwin's work, in that the natural world was suggested as responsible for the changes and behaviours of the many creatures that Humboldt confronted on his journey through South America (Richards 2002: 5; Wulf 2015: 134). Humboldt saw during his travels while in the tropical grasslands of Colombia and Venezuela the deep connection of the natural world, writing frequent passages such as "'how many things are connected with the existence of a single plant'", and how "'This one tree spreads life around it in the desert'" (Wulf 2015: 73). Humboldt had discovered the "idea of a keystone species…almost 200 years before the concept was named" (ibid.). What both Chambers and Humboldt relied on was the state of the art of natural knowledge—Chambers from his role as publisher and Humboldt from his passion for learning and adventure, and his role in the monarchical courts of Berlin. Both offered a grand narrative that revealed the origins of the world (as thought permitted in the early-mid 19th century) and the connection between life and that origin. They also offered the best account of the mechanisms of nature that connected the origins of

the world with speculations on the origins of life. These elements no doubt classify these texts as epics of evolution.

However, there are important differences between them. The most significant difference is that *Vestiges* provided an account of the origins of such mechanisms of nature, the world, and life within a natural theological framework. The influence of recorded history and a culture devoted to the Christian faith was a powerful force that was difficult to dispel, especially during the era of the British Empire's power and influence (Strong 2007). It is crucial, particularly for this project, to clarify the phenomenological, or 'spirit', context of the times in which these texts were written, as the perception of nature as derived from God was not limited to a few academics but was common among the general populace. Although England and Europe were transforming across nearly all social and cultural metrics—such as religious diversity, economics, education, governance, and so on—they nonetheless remained predominantly Christian. The naturalists and natural philosophers were revealing the goodness and power of God's work.

At a time when the Christian faith was spreading across the globe through missions, empire, and colonialism, belief in God was not optional, especially for anyone in the upper and lower classes. It has been the middle class who, throughout history, have led the charge towards secular ideals. The French Revolution (1789-1799) exemplifies this, but major proponents of natural, secular thinking in 19th-century England, like T. H Huxley, were middle-class. And it is the same today. But in a cultural region indebted to the personalization and division of the Church through the Protestant Reformation, German Romanticism was an expression of the succession of drastic cultural changes that occurred throughout the early modern period in Europe, some originating in the German-Prussian region itself. As a student of German Romanticism under the tutelage of Goethe, Humboldt wrote his *Kosmos* with this powerful influence in mind. As a result, *Kosmos* was the first Epic of Evolution that gave no

recourse to God, divine will, or any supernatural or deistic means.[10] The Cosmos of Humboldt's mind had no need for God: "Instead of God, Humboldt spoke of a 'wonderful web of organic life'" (Wulf 2015: 245); for Humboldt, nature alone was sufficient. Knowing nature "possesses truth and beauty, and will still be suited to enrich the intellect, to enlarge the sphere of ideas, and to nourish and vivify the imagination" (2010: 29).

Kosmos, however, is the exception rather than the rule here. God was the rule, not the exception. I have already detailed *Vestiges*, but other, later Epics of Evolution also had final chapters that revealed all of nature to be the work of God. Another work released in Victorian England by Richard A Proctor (1837-1888), *Other Worlds than Ours: The Plurality of Worlds Studied under the Light of Recent Scientific Researches* (1870), redirects the genre back toward God. This book, like *Vestiges*, was a critical success, with the likes of *The Science Record* (1872-1877), for example, claiming in 1872 that the work was a "vivid" and "ingenious" popularization of recent astronomical findings, while bringing in speculations based upon the broader significance of those astronomical lessons and those of Darwin. Continuously published well into the twentieth century with over 22 editions, this was Proctor's most popular book of his over 58 volumes.

Other Worlds is organized as a series of individual arguments so that each chapter can be read as an essay. Each chapter deals with its own subject, linearly building upon the previous chapter to expand in scope and scale. The shape of Proctor's argument is organized over the course of the entire book, so while each chapter is more or less self-contained, each contributes implicitly to the chief goal of the text. *Other Worlds* sets up the idea of "deep

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[10] *The System of Nature or, the Laws of the Moral and Physical World*, or *Système de la Nature ou Des Loix du Monde Physique et du Monde Moral*, (1770) written by Paul-Henri Thiry, Baron d'Holbach (1723–1789) under the pseudonym Jean-Baptiste de Mirabaud was probably the most succinct account of the natural world without citing God. It does not meet enough of the criteria to include it as an Epic of Evolution, though. Before this, other natural accounts from the pre-Socratics, including Lucretius' *On the Nature of Things* (*De rerum natura*) (1st C BCE), offered material accounts of the world, but again miss the identifying qualifications of the Epic of Evolution.

time", inviting the reader to imagine a vivid "picture" of "strange forms of vegetation," "air heavily laden with moisture", and "hideous reptiles" crawling and battling "each other or with the other denizens of the forest" long ago (2009: 17). "Astronomy," Proctor writes, "has a kindred charm" (2009: 18), and similarly describes a scene of deep space. "We see globes by the side of which our earth would seem but as a tiny speck" (ibid.), Proctor asks the reader to imagine worlds beyond our own and to embrace a greater cosmic vision.

Proctor, like Chambers, and later Sagan and others, uses analogy and the reader's imagination as the principal tools of his writing. Building up his arguments with the scaffolding of known phenomena, Proctor uses analogy to demonstrate not strictly the truth of his argument, but the likelihood of its possibility. So while chapter one is on the Earth, where Proctor draws upon geology, biology, chemistry and physics to demonstrate that "the way in which life is distributed over the earth's surface is full of significance" (2009: 23), chapter ten dares to leave our solar system and travel to the nearest stars to claim there is "every reason which analogy can give us for believing that the planets circling around [Betelgeuse] or Aldebaran are constituted of the same materials which exist in the substance of their central luminary" (2009: 251).

However, in the concluding chapter, Proctor spends the entire time there comforting the reader not to be upset by the book's contents. Reminiscent of *De Rerum Natura* by Lucretius (c. 99-55 BCE) and later Giordano Bruno (1548-1600), Proctor argues that if the universe is infinite, then God must be infinitely greater, and if so, then life and the worlds that life inhabits must be infinite; we cannot put limits on God's Creation, which is antithetical to God's infinite wisdom and goodness. Like Chambers, Proctor presents an evolutionary epic indebted to natural theology and the Christian Truth of God's Will in and for the world. This was also the case with the 1873 release of *Chronos: Mother Earth's Biography*, by the medical doctor Wallace Wood. Written in a much lighter tone and in the style of a dialogue,

this book follows a similar linear progression of natural events, from cosmic origins to the present. Chapter titles like “The Universe Unrolling” and “The Fishy Period” are ordered over eleven chapters, moving from the deep-time past to the possible future, culminating in chapter ten, “The Age of Psyche”.

However, the similarities end at following the same trajectory as Chambers’s and Proctor’s. Wood uses the book’s casual tone as an “in” for accessibility at the cost of respectability, with the *Westminster Review* calling it an “immature book written for the immature” (1873: 107). This review was likely written by Thomas Henry Huxley (1825-1895), who wrote the “Science” section, where the review is found, of the *Westminster Review* for most of his adult life. This bleak review of the book is notable for another reason in that Wood also takes God as a base premise of the universe, being the prime mover of the natural forces that Darwin wrote on, often thanking God for the good fortunes of America (1873: 315) or being subject to the misplaced theology of men being divine (1873: 306). But it is the review of this book that makes it so interesting, as the reviewer (likely Huxley) says,

> “Chronos,” by Dr. Wallace Wood is an attempt to popularize the results of the doctrine of evolution, where the story is told in the manner of a romantic narrative…the author of “Chronos” has set about writing the Epic of Evolution, though we are to understand that he has aimed only at gathering and arranging the materials for the coming poet to versify (1873: 107).

This is quite an important discovery, as it shows that, notwithstanding the negative review, this writing format—what we would now call a genre—was called an Epic of Evolution in 1873, 127 years before Secord led historians of science to label such narratives as Epics of Evolution. And in this case, the meaning applied is the same as that Secord and others meant. We have a romantic account of the application of science to the material and organic matter of the universe, hinging on the concept of gradual change over long periods of time.

But while this is an Epic of Evolution in the sense that Secord, Lightman, and others mean, it still represents a religious interpretation of the epic. It is essential to consider that only a small number of naturalists were actively pursuing material-only explanations for the world, devoid of God, in the wake of Darwin's great work. The religious Epic of Evolution, as Lightman detailed (2007: 222), revealed the world as the Victorian mind comprehended it, comfortably fitting within their worldview and understanding. Science, Peter Harrison (2015) writes, was being "constructed in a way that resembled the early modern construction of the idea 'religion'" (146-147). The professionalization and development of more cohesive, recognizable methods, often dubbed the "scientific method", would create the conditions for science *and* religion, in the sense of a difference between the two. But it would be folly to assume that the emergence of science as a professionalized field pitted science *against* religion, and it would be further amiss to believe that the population of Victorian England and the other North Atlantic countries that experienced similar changes in science quickly abandoned their faith for science. Chambers' *Vestiges*, Proctor's *Other Worlds*, and Wood's *Chronos* were the norm in this regard.

This is critical in our journey towards *Cosmos*, for the Epic of Evolution, as Bernard Lightman has hinted at in *Victorian Popularizers of Science* (2007), was often written within the framework of a teleological design, whether for life on Earth or more grand visions of cosmic design (222), with few secular-based versions developing at the tail-end of the 19th century like Edward Clodd's (1840-1930) 1888 *Story of Creation* (257). Adapting natural theology for larger, grander, more cosmic purposes by framing the universe in terms of teleological progression was not only characteristic of the ideals of the time but also ensured the place of God within naturalist thinking. Moreover, it kept friends and sales dependable (256). As shown above, God was ever present with Chambers and Proctor, revealed as a grand conclusion to their explorations of space and time. While not true in Humboldt's or

Clodd's case, most books in this category in the 19th century are therefore explorations of *God's work*, even though they may appear less so at first. Humboldt, Clodd, and a select few others are the exception.

Developments in natural knowledge that enabled the evolutionary epic to be possible, in part, offered an interesting overlap with Creation in the Biblical canon. Endowing the findings of naturalists with God's Creation was, as we have seen, one way in which the epic's authors told their stories. But another development in science popularization was underway, bringing us a little closer to *Cosmos* still. Arabella Buckley (1840-1929), the daughter of a Reverend and a close friend of Alfred Russel Wallace (1823-1913), was the first "in bringing together spiritualism with the evolutionary epic" (Lightman 2007: 239). Spiritualism in the 19th century was a growing belief in the spirit (think soul) continuing to exist in some capacity on the material plane after death, a practice involving mediums and other intermediaries for communicating with the deceased. Beginning in the mid-19th century in New York and migrating to London shortly after, it became quite fashionable, inspiring an age that gave rise to many of the ghost stories and superstitions still told today. It was through this early spiritualist practice that Buckley and Wallace became close (Lightman 2007: 239).

Buckley produced two major works that qualify as Epics of Evolution. The first is *Life and Her Children* (1880), and the other is *Winners in Life's Race; or the Great Backboned Family* (1882). In both, Buckley offers her insights as a student of great natural historians and naturalists, like Charles Lyell and his wife Mary Horner, to detail how heroes of science revealed the process of life on Earth. Darwin also encouraged Buckley, who shared admiration for Lyell, and Buckley was considered one of Darwin's friends (Lightman 2007: 241). Embedded in the trenches of Darwinian thinking, Buckley situates her work within the broader movements of natural thinking of the time, grounded in Darwinian natural selection. Buckley's emphasis in her work, however, was less intensely focused on the material need

for resources and control in a "survival of the fittest" based on environmental conditions, but instead offered a version that was an "evolutionary theodicy" with a "progressive and individualistic spin" (Lightman 2007: 245). Instead of focusing on the importance of how physically fitted and adapted to an environment flora and fauna were, Buckley was concerned with "'the great moral lesson taught at every step…the law of SELF-DEVOTION AND LOVE'" (Lightman 2007: 249).

Buckley's Epic of Evolution raises a question about the fit of her work into the classifications noted above: idealist, materialist, secular, and religious. The spiritualist movement of the 19th century was inspired by the idea of continuance beyond death, an idea that has a long and complex history. However, in the Western canon, the idea of soul, or a continuance of the individual, can be traced to Plato's *Phaedo* (*On the Soul*) and Aristotle's *De Anima* (On the Soul), which would be adopted by early Christian theologians like Augustine of Hippo (354-430) and medieval ones like Thomas Aquinas (1225-1274). Like the field of science and religion itself, the placement of spiritual practices, for simplicity and convention, is often put in with "religion". Given the historical connection of the object of interest and the pervasive nature of Christianity in Victorian England, along with the standard convention of the field of science and religion studies, it would be fair to maintain Lightman's classification of a religious epic here. However, I would claim that each of the religious versions of the epic covered above is idealistic to our sensibilities, even though they were blasted as "materialist" upon review (Secord 2000: 278).

This contemporary charge of materialism raises a critical tension: as the title suggests, the Epic of Evolution is predicated on evolution, which did conflict with Christian religious doctrine and was denounced as materialist regardless of any theological dressings applied to it. While Chambers, Proctor, and Buckley are not materialists themselves in the hard sense of the word, they nonetheless had to contend that their work brushes against a materialist

explanation for the world's organisms, including themselves. The pre-Darwinians, the post-Darwinians, and, into the present, with the likes of E. O. Wilson and beyond, all situate their narratives within an evolutionary paradigm. This is true regardless of time or subject. So, while those texts that focus on Earth and its flora and fauna are predicated upon evolutionary thinking, so too are texts that extend beyond our world and into the stars. The fervour that Darwin's work aroused among the educated naturalists of the time led them to hyperextend natural selection principles beyond biologics and into cosmology. What may have created some stir with the application of natural law to the world of God's worldly creations was now grafted onto the solar system, nebulae, galaxies, and more. In *Other Worlds*, Proctor goes so far as to suggest that God's infinite wisdom and infinite power may indicate that, given an infinite universe, other life may exist around the stars beyond.

Evolution is the backbone, the thesis of these narratives, and this is one dividing point from the Grand Cosmic Narrative. The GCN is *not* built on the ideals of evolution. As I detailed in Chapter One and expanded on in this chapter, several social and cultural factors, unlike those present in the 19th century, fundamentally changed the orientation of *Cosmos'* origin. But the main difference, as is reflected in the title, is that the cosmological is at the forefront of the programme's narrative. The discoveries and theories of physics and chemistry are represented in nearly every episode, while evolutionary biology represents one episode of the series. This is critical because the evolutionary epic is a narrative that is both a historical artifact and a hope from natural historians/philosophers, popularizers and evolutionary biologists. While the overall structure may be similar, it is nonetheless oriented toward the organic development of life from "lower to higher forms", as were those of the 19th and into the 20th century around the time of the modern synthesis (Ayala 1974). The premise is that, by understanding the development of species and the connections among them (including ourselves), we can be oriented towards, in the case of 19th-century

evolutionary epics, a more rational, objective approach to God's Creation, or, in the case of Humboldt, to Nature, or whatever.

One final point before we move on is that these Epics of Evolution, so popular in the 19th century, were missing a key aspect that the GCN takes as central to its story: a visually driven narrative dimension. While images and pictures were indeed present in books throughout the 19th century, they were expensive and used sparingly. When Darwin released *Origin* in 1859, it contained only one illustration—a lined, graph-like image called "Diagram of Divergence of Taxa," which represents the tree of life, with branching, diverging lines representing the many species. Evolutionary epics by Chambers and Proctor lack illustrations, leaving readers to visualize or imagine the scenes, which is why the authors relied heavily on metaphor and analogy. The GCN extends beyond these tried-and-true methods and achieves its status through a potent mix of prose, visual accompaniment, and, importantly, the addition of the audiovisual medium, such as television. But here it is important to note one more science-based grand narrative form that we must contend with before we move on, more recent and more akin to *Cosmos* in that it also includes the visual, audio, and textual that television allows: the "Humanist Blockbuster".

The Humanist Blockbuster

Introduced by the historian of science Alexander Hall of McMaster University, the Humanist Blockbuster is produced by large-budget programmes that situate humanity in a universe-spanning narrative, offering religious language of awe and spectacle and human exceptionalism as the core features of its story. However, Hall also states in the same chapter of Lightman's edited 2019 collection, *Rethinking History, Science, and Religion*, that Humanist Blockbusters "are big-budget documentaries that utilize a grand narrative centred on the progressive nature of scientific discovery and rely on spectacular visuals and the language of awe. They use scientific theory to show that humans are not fundamentally

different from other animals, while also maintaining a form of human exceptionalism, with scientific endeavour along with other cultural phenomena used to argue that humans are distinct from and superior to other species" (Hall 2019: 145-146).

Here, we have two similar descriptions of what the Humanist Blockbuster is. The first quote is slightly different and could be read as offering a grander cosmic version. At the same time, the latter is more focused on scientific discovery as a progressive enterprise, developing greater descriptive power over time. The first also importantly includes more detail on the development side of production, while the latter does not. While I do not want to suggest that these differences are *that* crucial to muddying Hall's overall claim, I do argue that, regardless of these differences, the category does not fit the *Cosmos* series. The Grand Cosmic Narrative is different in a few critical respects. This becomes clear if we look at Hall's example of the Humanist Blockbuster—*The Ascent of Man* (1973) by Jacob Bronowski (1908-1974).

From the get-go, *The Ascent of Man* is presented differently from *Cosmos.* Hall states, "The series traced the development of human society across history via its understanding of science…which situated humans in a grand evolutionary narrative" (Hall 2019: 145). The contrast between *The Ascent of Man* and *Cosmos* is already strong enough for me to claim that the two programmes are doing very different things. In Hall's conception, the Humanist Blockbuster is about how human society developed from *Australopithecus* to the environment-defining species it is today; a type of sociobiology of civilization leading to what we would now call the Anthropocene (Ellis 2018). This is made clear through the thematic arrangement of the series, with episode one titled "Lower than the Angels" detailing early hominids, to later episodes on the developments of architecture via maths and material sciences that lead to the great cathedrals of England (Ep. 3: "The Grain in the Stone"), to the industrial revolution, to the growing knowledge of the architecture of the brain from the recent developments in, and founding of departments of, neuroscience in the late 1960s (Ep.

13: “The Long Childhood”). In each episode, Bronowski takes a theme of civilization—construction, industry, philosophy, art, or language—and offers a fascinating overview of it through the historical development of those areas, using scientific knowledge as the foundation for that development.

I would argue that Hall misidentifies the scope, reach, and scale of the argument made in *The Ascent of Man* in his account of what the Humanist Blockbuster is, suggesting, in the first rendition of the Humanist Blockbuster, that its reach is grander than it is in the programme. At the very beginning of the introductory episode, which sets the tone for the entire programme, Bronowski states, standing on a Californian cliffside, that “Man is a singular creature. Unique among the animals so that, unlike them, he is not a figure in the landscape—he is the shape of the landscape” (Malone and Jackson 1973). The scene then changes to a beach on California’s Pacific coast at night. Bronowski tells the viewer that the “Californian Indian” told stories of fish dancing on the beaches during the full moon. He explains that the Californian Grunion fish gather on the beach during the full moon because the tide is low; the females lay their eggs on the beach, and the males “dance” around them to fertilize the eggs. Visually, it appears as if the fish are dancing.

This exemplifies the narrative of *The Ascent of Man*. Focused on the Earth, its flora, its fauna, and human beings. It tells the story of humanity’s evolution and the development of its knowledge. It exemplifies science, tells a story influenced by science, and forces anthropology into the same classification as the natural sciences. It is my position that *The Ascent of Man* is more in line with the evolutionary epic than *Cosmos,* which is a Grand Cosmic Narrative. While *Cosmos* talks about evolution in one episode, it isn’t *about* evolution. Hall writes at the end of the same chapter that “many of the production team from *The Ascent of Man* moved to the United States and were instrumental in globalizing this very particular brand of documentary. Most notably, Carl Sagan’s *Cosmos: A Personal Voyage*

(1980) was directed by *The Ascent of Man* producer Adrian Malone" (Hall 2021: 227). However, I claim this is a misrepresentation: it is similar in design, but the narrative's focus differs. To demonstrate the difference, I will offer examples from *A Personal Voyage* (APV) and *A Spacetime Odyssey* (ASO), using both series' episodes on evolution to draw as close to an overlap as possible.

Cosmos

The Grand Cosmic Narrative in *Cosmos* wants to demonstrate that the "Cosmos is all there is or ever was or ever will be", situating that statement within a *grand cosmic* framework much older, richer, and more encompassing than the "competing" narratives above. One element that differentiates *Cosmos* from the Epic of Evolution and the Humanist Blockbuster is, as the title states so undramatically, about the Cosmos. Science is the instrument of discovery and understanding, connecting the very small to the very large. *Cosmos* makes the case that the history of the Cosmos is as fundamental to the human story as the human story is to the Cosmos. It encourages the viewer to consider all the elements of the Cosmos in full, vivid detail, as revealed by science, so that each and every object becomes meaningful. Everything, in this view, is an expression of the Cosmos. Instead of relying on facts and figures in a linear arrangement like in *Vestiges* and *Other Worlds*, *Cosmos* presents a compelling non-linear narrative that combines the language of religion, like reverence, connection, and stewardship, along with the typical attributes of awe and spectacle, with human and cultural stories to engage and impact the audience (Dahlstrom 2014; Hoffmann 2014; Martinez-Conde and Macknik 2017).

The fact that the Grand Cosmic Narrative is told on a television screen reminds us that a few factors are essential to consider when comparing it to the Epic of Evolution, even though the Humanist Blockbuster could be conceived more closely to the Epic of Evolution.

The first is that the Epic of Evolution is primarily a text-based genre, at least as it is presently formulated. The written word is a central component of human communication. There is no need or room to detail its importance here, but suffice it to say that the written word can build and change worlds, inspire and incite personal change, emotion, and more (Goody 1986). However, television allows a perspective of realism, if that is the creator's intention, that taps into the intuitions and senses of reasonable expectations of what the world is like and what the world of the television screen is like (Moon 2018: 44). Seeing the Cosmos is easier and more intuitive than reading about it. This is why the descriptive strategies of analogy and metaphor were crucial for communicating science and establishing science popularization with the rise of mass-printed books.

This connects to the second factor in that these strategies are capable of extensive explanatory and emotional work, given that the television screen offers a multimodal experience, tapping into the visual and auditory senses. For example, as I detailed in Chapter One (p.20), the Cosmic Calendar sharply contrasts the scale difference between our regular human time and cosmic time, combining analogy and metaphor into a seamless audio/visual experience that permeates the entire series. The Cosmic Calendar utilizes cutting-edge special effects and powerful musical accompaniment to educate and bring meaning to these humbling revelations of time and space. With swelling music and engaging visuals, the audience engages the GCN's narrative via numerous means, encouraging broader appeal and lasting memory of the content.

In this final section, I will analyze one episode from each of the two *Cosmos* programmes studied for this project, both of which are episode two of their respective series. These episodes are unique because they focus solely on evolution via the modern synthesis, which combines natural selection and genetics. This is unique because every episode of *Cosmos*, across all versions, tells a story that integrates multiple scientific disciplines. It could

be understood as done this way to address the science that is most at odds with Scripture, especially in the United States of America. As I outlined in Chapter One, the writers of *Cosmos*—Carl Sagan, Ann Druyan, and Steven Soter—were practicing scientists and communicators. Druyan and Soter returned to write the 2014 reboot and spiritual successor to the original, which uses the same framing and many of the same cues and imagery. In this way, the series as a whole is, in fact, one series separated by a generation.

Cosmos: A Personal Voyage

The title of each episode becomes the theme which builds and harmonizes the stories being told. The title of the episode from APV, which I will look at first, is "One Voice in the Cosmic Fugue." The "one voice" refers to the voice of Earth, and a "Fugue" is a musical composition in which a short melody or musical phrase is played and then successively taken up by others, developing gradually as the parts are interwoven and connected, eventually becoming a complete harmony of melodies. Sagan uses this theme throughout the episode, referring to Earth biologists studying "one lonely theme in the music of life" and asking if it is "the only voice for thousands of lightyears? Or is there a cosmic fugue—a billion different voices playing the life music of the galaxy?" (01:16).

To explain how Earth came to be "burgeoning with life," Sagan will "tell a story of one little phrase of the music of life on Earth" (01:54). That story is the Battle of Dan-no-ura of 1185. Sagan tells the story of "Dan-no-ura", a story still told today in Japan. It is partly recorded history, partly legend, partly folklore. While the example of the "dancing" fish in *The Ascent of Man* is similar in its use of folklore-like stories, it is fleeting, spending little time with it, and is used merely to highlight the anthropological and historical record of other cultures. Here in *Cosmos*, the time spent on this story, which is told while a live-action interpretation unfolds, shows respect for the oral histories and legends of different cultures,

even though they're likely to contain factual errors. This is a testament to the narrative that *Cosmos* is telling—one that is both cosmic *and* global *and* local. While *Cosmos's* task is science education, equally important is demonstrating how the story of science and the story of the Cosmos are also the story of the interconnection of life on Earth.



A live-action sequence of the Battle of Dan-no-ura to set-up his discussion on Artificial Selection (APV Ep. 2 - 05:26).

The Battle of Dan-no-ura took place on April 25, 1185, and was fought in the Shimonoseki Strait. It was the last act of the Genpei War of 1180–1185. Its conclusion brought about the collapse of the Taira clan's political hegemony in Japan, one of the four major clans at the time. As part of a major naval engagement, the Minamoto forces, commanded by Minamoto no Yoshitsune, capitalized on shifting allegiances, especially the defection of the Taira-aligned forces under Shikoku leader Taguchi Shigeyoshi. This allowed the Minamoto to secure a decisive victory and the total destruction of the Taira fleet, including the drowning of the child Emperor Antoku, and the loss of the sacred sword Kusanagi from the Imperial Regalia. This story endures in modern Japan as a foundational

mythos that structurally informs civic life and the Buddhist philosophy seen in the child Emperor's sacrifice.

After concluding the story about the Samurai and introducing artificial selection, Sagan, standing in the English countryside, asks viewers to consider all the plants and animals that inhabit a typical farm. He says, "They are, almost all of them, made by us" (10:18). He explains how humanity has guided, without knowing the mechanism, the development of almost all the foods we enjoy today. Sagan asks, "If artificial selection makes such changes in only a few thousand years, what must natural selection, working for billions of years, be capable of? The answer is all the beauty and diversity in the biological world" (11:07), much like what Darwin did in the first chapters of *Origin of Species*. Sagan continues by describing some of the evidence for natural selection, then, with calmness and focused sureness, Sagan says to the camera, "Evolution is a fact, not a theory—it really happened" (12:07).

This line will be adopted in the 2014 reboot with the same framing and intensity. But, of course, this line is not scientific. It is akin to the line that opens the series quoted at the beginning of Chapter One. From the perspective of its critics—particularly within the intelligent design movement—evolution, like the opening line of *Cosmos*, is characterized as untestable, unverifiable, and a claim of faith, a framing that, while rejected by the overwhelming consensus of the biological sciences, reveals something important about the rhetorical strategies through which the conflict thesis is sustained. The conflict, in other words, is not merely about the content of scientific claims but about who gets to define what counts as science in the first place. This is another essential factor of the GCN. To build a world where natural explanation motivates and situates, one must be willing to push the possibilities of explanation if the world is to be logically consistent. Nearly all scientists

(97%) agree that life evolved, and 87% agree that natural causes drive evolution (Rosentiel 2009: 37). Life as we know it today makes sense only with the modern synthesis of evolutionary biology as the explanatory framework. In effect, this is a fact. The difference here is that it is marked by a history of religious conflict, a critical reminder of the importance of values in the cultural acceptance of knowledge.

Sagan focuses on some of the counterclaims Creationists make against evolution but concludes that evolution is "equally human, and far more compelling" (14:05). Sagan continues with the theme of the episode that "Natural Selection, which makes the music of life more beautiful as the eons pass" (14:12). While Sagan briefly discusses the evolution of life from its beginning, we are told that "Green plants had released copious amounts of oxygen and nitrogen [into the atmosphere]. The sky is made by life" (19:18) and warns that "There are so many plants on the Earth, that there is a danger of thinking them trivial, of losing sight of the subtlety and efficiency of their design" (31:13).

I want to spend a moment unpacking Sagan's use of language and how it separates *Cosmos* from *Vestiges* and *Ascent of Man*. Throughout the *Cosmos* series, metaphysical claims border on theological, of which I have noted two already. When Sagan illuminates the "subtlety and efficiency of their design" or reflects on "all the beauty and diversity" or claims "the sky is made by life", he is presenting metaphysical characteristics, those unquantifiable by the methods of science, not expressible by hypothesis or repetition, imprecise in its description scientifically, but chock-full of poetically rich value. To build the framework for a way of thinking grounded in the material world and as expansive as the universe itself is a task that Sagan and Druyan understood to necessarily include the "biblical cadence" mentioned in the introduction. We can reasonably infer that this thinking permeates the entire script, recurring throughout its Grand Cosmic Narrative.

And while the Epic of Evolution and the Humanist Blockbuster make similar claims and employ similar narrative framings, *Cosmos* takes this much further. Epics of Evolution by spiritualists such as Arabella Buckley weave moral tales, but, as I said above, these epics are limited to life on Earth through a window that Darwin had recently opened. Through natural selection, Buckley could weave moral education into children's lives. For example,

> If in a large school every boy had a prize at the end of the half-year, whether he had worked or not, do you think all the boys would work as hard as they do or learn as well? If every man had all he required, and could live comfortably, and bring up his children to enjoy life without working for it, do you think people would take such trouble to learn trades and professions, and to improve themselves so as to be more able than others?... No, it is the struggle for life and the necessity for work which makes people invent, and plan, and improve themselves and things around them (Buckley 1885: 5-6).

Here, we witness how evolution permeates the evolutionary moral argument as we read how the trials of schoolboys and the labours of men are naturally derived conditions for the betterment of all. While these lessons are derived from science, they are limited in scope and bound to the conditions of natural selection on Earth. It demonstrates that the way life is for boys and men reflects natural processes, not that the way of life and men are enriched by knowing it, only that they are alike. This is a very different lesson.

Further, underlying all of this is the spiritualist dimension from which Buckley and Wallace contended. We can read Buckley's argument as a plea to adequately maintain the spirit or soul in the material world, for if a spirit were fulfilled and unhindered by the burdens of life, death would allow it to transcend to the immortal plane and not be stuck in purgatory. Thus, for Buckley and the spiritualists, to know the natural laws of God meant to live within the boundaries of His gift, and to do so meant to live well. Therefore, knowledge of nature was the best way to ensure one was well-positioned for death's transcendence. If not, being stuck between the material and spiritual worlds was the consequence.

Theists, however, writing on the natural objects and phenomena of their choosing, had done so because such investigations embolden and bring definition and glory to the Creation and to God. Natural selection, as the most contentiously intertwined theory with religion at the time, offered an explanatory framework akin to the tradition of natural theology, revealing God's greatness in His intentions for the world, but was predicated on natural law and material explanations. Natural theology had espoused a notion of useful design, such as the human eye, and the eye's sophistication was evidence of a designer, i.e., God. It was William Paley's (1743-1805) *Natural Theology; or Evidences of the Existence and Attributes of the Deity* (1802), that was the most seminal work in this tradition of natural theology (Brooke 2014: 261). In this conception of Creation, the world would be a reflection of God's being. If the Word was Good, and the Word created the world, then the world was Good because it was made from the Word. I think this was a profoundly comforting view for many and a reason why natural selection would be embraced in a new evolutionary-inspired natural theology, as in the religion-focused Epic of Evolution we saw above. It could inspire a wide range of readers, from the upper social classes who saw their position as secure in a hierarchical "great chain of being" to the lower classes working and/or struggling to feed their families. In both cases, for the spiritualist and the theist, the moral overlay situated one within a larger framework.

However, Sagan, by expanding on and drawing from this tradition, presents a narrative that draws on the rich frameworks of science popularization and extends them to critically engage with ethical education from a broader, purely materialist perspective. The Grand Cosmic Narrative's moral education is manifested in the vast bounty of knowledge drawn from the numerous traditions of science, aimed at presenting a moral structure not based on living in accordance with nature's laws, but rather on aligning with the methods of understanding these laws provide. For instance, compassion serves as an ethical outlook on

life and its intricate web of interconnected relationships, not driven by altruistic evolutionary motives, because, from the standpoint of cosmic significance, life is rare and thus valuable. Sagan weaves wonder and awe into this argument and throughout the episode through his writing, set design, special effects, and swelling music. By intentionally framing the narrative, Sagan encourages viewers to perceive the Cosmos, the world, and all its flora and fauna (including us) as unique expressions of natural processes. As he famously states in the first episode, "we are a way for the Cosmos to know itself" (Sagan et al. 2000). Echoing this assertion, after discussing the core biological element of life—DNA—and revealing the subtlety and complexity of its mechanics, Sagan articulates that "We are, each of us, a multitude" (41:41).

Sagan walking through the Royal Botanic Gardens, Kew, after explaining how each of us is composed of "trillions of cells", each containing trillions of atoms. Sagan provides some details about what knowing about



this microcosmic universe within us may allow in the future. (APV Ep. 2 - 46:26).

As I claimed above, the television screen is a critical differentiating factor separating the Epic of Evolution from the GCN. Since evolution by natural selection is a process that is

not easily comprehensible without assistance due to the vast amounts of time and the variation of species over those unfathomable periods, a tool to aid in understanding is essential. This consideration is crucial in combating evolution denial. It is why, in text-based forms, analogy and metaphor were, and continue to be, so vital. As I mentioned in Chapter One, to help make sense of the immensity of time presented in *Cosmos*, and to utilize the medium of the television screen along with the possibilities that digital production technologies offer, Sagan introduces viewers to the "Cosmic Calendar." Like *Vestiges* and *Other Worlds*, employing familiar objects and systems is essential for presenting concepts that are impossible to grasp without them. The Cosmic Calendar provides Sagan with a familiar visual and explanatory tool for illustrating how the entire history of the Earth and our solar system occupies only the last four months—the autumn of the cosmic year. Sagan's use of the Cosmic Calendar and the analogy of a cosmic autumn clearly indicates that evolution is not the central framework for this narrative. While in *Vestiges* and *Other Worlds*, Chambers and Proctor suggest that natural forces, by the Grace of God, have driven variation and adaptation, Sagan utilizes the Cosmic Calendar to illustrate how natural processes, without exception, move matter to foster life in virtually endless amazing forms. He demonstrates that, from the cosmic perspective, life is a privilege.

To accompany this framing of life, music, like storytelling, is fundamental to the human experience, adding emotional and sensory depth to these moments. As I have claimed, evolutionary epics are predominantly text-based mediums; therefore, music cannot be a part of their narrative. On the other hand, the Humanist Blockbuster in the example of *Ascent* uses music sparingly, often only during non-narrated sequences of animals, architecture, or human actions. But music is critical to *Cosmos*. Anthropologists have detailed how cultures across the Earth, unconnected through space and time, have independently created music (Harvey 2017, Huron 2001, Jan 2022). Throughout the first *Cosmos*, what is heard are some of the

most important and influential pieces of music from the North Atlantic canon and from worldwide sources.

This selection is not incidental. By consistently underscoring images of cosmic process and natural phenomena with works already recognized as pinnacles of human creative achievement in the North Atlantic's canon—Bach, Beethoven, Pachelbel, Shostakovich, Vangelis—*Cosmos* constructs an implicit rhetoric in which nature is positioned as the supreme aesthetic object: the original of which even the greatest human art is merely a reflection or imitation. The canonical music does not simply add emotional depth to the on-screen narrative, but carries the full weight of its cultural veneration and transfers that veneration to the Cosmos itself. When viewers hear Beethoven's Seventh Symphony as they watch civilizations rise and fall on distant worlds, the sublime already encoded in the music is fused with the sublime revealed by science, producing an experience in which the overwhelmingness of nature and the overwhelmingness of great art become indistinguishable. This strategy, which recurs throughout both series and which I will trace in subsequent chapters, is a distinctive feature of the GCN's rhetorical method: it recruits the prestige of high culture in the service of a popular culture text, hybridizing the two in ways that neither the text-based Epic of Evolution nor the sparingly scored Humanist Blockbuster could achieve.

For example, Sagan explains that on the grand scales of time of the great epochs of our planet, it is entirely conceivable that DNA mutations would occur, leading to environmentally advantageous adaptations, given what we have witnessed of DNA over only a few decades of observation. While Sagan is explaining, the piece "Canon in D Major" plays. "Canon in D Major", or simply "Canon", is a 17th-century composition by German composer Johann Pachelbel. The piece fell into obscurity for most of the eighteenth and nineteenth centuries, before being re-orchestrated in 1968 by Jean-François Paillard (Fink

2010). It became hugely popular over the next decade, and by the late 1970s, it was the most-played piece at Western weddings, funerals, and graduations, times of essential steps in the cycle of life (Fink 2010). Those two occurrences—life and death—are still the most influenced by religious tradition in the totality of Abrahamic practices today. Selecting "Canon in D Major" would, therefore, be deliberate, creating not a tension with religion but a recognition of the subtle relationship between social structures and natural law.

Cosmos: A Spacetime Odyssey

Continuing to the 2014 reboot with Neil deGrasse Tyson, *Cosmos: A Spacetime Odyssey*, the episode begins deep in space, with a fantastic rendering of the Fairy of Eagle Nebula, while Tyson says, "This is a story about you, and me, and your dog (00:09). We then see Tyson sitting at night, surrounded by what appears to be New Mexico terrain, with stars blazing overhead and a crackling campfire burning in front. And then Tyson, beginning much like Sagan did, tells a story: "There was a time long ago when dogs didn't exist. Now there are big ones, small ones, snugglers, guardians, hunters – every kind of dog you could possibly want. How did that happen?" (00:29). Tyson then asks us where all the living things on Earth came from, concluding, "The answer is a transformative power that sounds like something straight out of a fairy tale or myth – but it's no such thing" (00:44). The use of myth here is another deliberate choice by Druyan and Soter to show that science can reveal aspects of the world that have myth-like qualities, a prospect shared by Big History.



Tyson pokes a fire as he begins to tell a "story" (ASO Ep. 2 - 00:19).

Tyson invites us to go back in time with him aboard the Ship of the Imagination, some thirty thousand years to a time of perpetual winter. "Our ancestors were wanderers, travelling in small bands. They slept beneath the stars. The sky was their story book, calendar, instruction manual for living" (02:38). Tyson concludes boldly, "Their idea of home was Earth itself" (02:50). In the fire, we see silhouettes of a small tribe of our ancestors sitting around a fire, crafting and socializing.

Tyson builds a picture in the viewer's mind, building the case that human hands guide the design of dogs. Tyson says, "Turning wolves into dogs was the first time that we humans took evolution into our own hands…every dog you see was sculpted by human hands" (06:41). A dog joins Tyson beside the fire, and then he asks the viewer, "If Artificial Selection can work such profound changes in only ten or fifteen thousand years, what can Natural Selection do operating over *billions* of years? The answer is all the beauty and diversity of life" (08:07), creating a reflective symmetry with Sagan in the first *Cosmos*.

Since the original *Cosmos* in 1980, the human genome was sequenced in 2006, along with many plants and animals since then. Given these advances, the 2014 version of the

episode on evolution begins with natural selection through the fundamental component of evolution: genetic mutation. Tyson takes us back to the time of our ancestors during the last Ice Age, when Ireland was covered in kilometres of ice. Aboard the Ship of the Imagination, we see what appears to be a Grizzly Bear in the viewfinder, traversing the frigid desert of Ice Age Ireland of a time long ago.

Shrinking down to the cellular level and descending into that great bear, plunging deep into the tissues, through the heart, into the ovary, and finally entering the cell of one of her eggs, Tyson says, "If life has a sanctuary, it is here in the nucleus" (10:57). Through the viewfinder of the Ship of the Imagination, glowing with a white-gold hue, double helices float gently throughout the interior of the cell's nucleus. With this heavenly-hued view, Tyson explains deoxyribonucleic acid, DNA, and how its four-letter alphabetic pattern informs the entirety of a living organism. Tyson continues that DNA is "the ancient scripture of our genetic code, and it is written in a language that *all life* can read" (11:08). After a brief rundown of the composition of DNA, followed by a demonstration of how DNA copies itself, as well as how mutations occur—in this case the gene that controls fur colour—Tyson concludes this section by telling us, "There are as many atoms in a single molecule of your DNA as there are stars in a typical galaxy. The same is true for dogs, and bears, and every living thing. We are, each of us, a little universe" (12:07). Once more, we have a call-back to the original *Cosmos*, reinforcing the notion that this not only shares a lineage with that original story and the importance of Sagan, but that one living thing is as unique and complete as the universe itself. This vital theme continues throughout all the series' episodes.

The scene shifts back aboard the Ship of the Imagination, and, returning to standard size, Tyson begins to de-provincialize evolution, telling us, "Mutations are entirely random and happen all the time, but the environment rewards those that increase the chance of survival; it naturally selects the living things that are better suited to survive, and that

selection is the opposite of random" (14:46). This critically targets some claims, especially from Creationist groups, that the randomness of natural selection is antithetical to God's Will. Some even go so far as to make the case for scientific and mathematical models that claim evolution is an impossibility, but these are often pseudo-scientific, cherry-picking or misrepresenting aspects of evolutionary biology and mathematics to give the veneer of authority and rigour (Morris 2003).

After Tyson provides a very brief discussion of the history of Darwin's work on natural selection and its general impact on society, specifically our kinship with apes, numerous cartoons followed the publication of *Descent of Man* (Radick 2013: 178). Tyson asks, "But what about our kinship with the trees?" (16:37), as he stands in front of the same tree in the Kew Gardens where Sagan stood for the same thematic episode in *A Personal Voyage*. After diving into a leaf and the nucleus of its cells, the tree's DNA, in the same white-gold aura, is shown, and then the DNA sequence of Tyson and that tree is displayed on screen. "The DNA doesn't lie. This tree and me are long-lost cousins, and it's not just trees! If you go back far enough, you'll find that we share a common ancestry with the Butterfly, Grey Wolf, Mushroom, Shark, Bacterium, Sparrow. What a family!" (17:30). The tree is shown in a wide-angle shot, glowing with the same white-gold of the DNA, "This is our Tree of Life. Science has made it possible to construct this family tree for all the species of life on Earth…Science reveals that all life on Earth is *one*" (20:46).



Tyson walks towards the same tree that Sagan sat at (shown above) in the original 1980 version. (ASO Ep. 2 - 15:59).

Here is a good example of the similarity and a critical divergence from the other science narratives discussed above. The Epic of Evolution and the Humanist Blockbuster both utilize the most state-of-the-art science to construct a narrative that gives materialist accounts of life and world. While the Epic of Evolution expands its reach to the stars to tell its story of life on this planet, in *Vestiges*, it reaches its conclusion to "improve the knowledge of mankind, and through that medium their happiness" (Chambers 1844 [1994]: 387). The moral lessons offered "endeavour to promote their happiness as well as our own, in order to find ourselves truly comfortable in this field of existence" (Chambers 1844 [1994]: 383), but as the last chapter makes clear "These are words which God speaks to us as truly through his works, as if we heard them uttered in his own voice from heaven" (ibid.). It is, therefore, that science is the tool of reason to uncover God's Creation. In this conception, His Word is the inspiration that motivates the research into the natural world, and it is that inspiration that motivates the moral framework of the good life.

But what *Cosmos* shows with the tree of life is that science gives meaning to knowing the natural world as an end in itself; it doesn't allow for any extension further than the material knowledge of the natural world. I hold that this is a critical difference. I grant that at the time of *Vestiges'* writing, the question of God had only recently become a matter of debate. Paley's *Natural Theology* was released at the beginning of what would become a rapidly changing century. Paley's unprecedented work brought the rapid advances in natural philosophy and natural history into dialogue with God's Will, creating a much more personal and personality-rich God. *Vestiges* and *Other Worlds* were part of this tradition. But it sparked debate amongst the academic elite and the masses, both asking whether the organic transformation of species required divine initiation. The historian of science and religion, John Brooke, writes that what Chambers had achieved was an "instance of that ironic pattern…The association of natural theology with the extension of natural law had an effect rather like the Trojan horse. It smuggled a full-blown naturalism into territory that upholders of a more conservative natural theology, such as Whewell, still considered holy ground" (2014: 303).

I contend that *Cosmos* was the Trojan horse Brooke refers to, lying dormant for 178 years, finally evacuated of its hiding and waiting naturalist soldiers. This metaphor is suggestive, but I want to be careful, as a Trojan horse, after all, is an instrument of decisive conquest, and there is little evidence that the GCN has conquered the conflict thesis in any decisive sense. The metaphor is perhaps better understood as aspirational: the GCN has smuggled a more complex understanding of science and religion into popular culture, but whether that understanding has actually taken root in the minds of its vast audience—or simply coexists, unintegrated, alongside the conflict thesis—remains an open and empirical question for a larger study. Cultural penetration and ideological transformation are not the same thing.

While the Grand Cosmic Narrative may seem like a similar narrative of science that, at first glance, appears detached from any historical, philosophical, and theological roots, as my analysis of *Cosmos* at the end of Chapters Two through Five will show, this detachment is more performative than actual. The GCN's relationship to such roots is complex: it sometimes obscures them, sometimes tacitly relies upon them, and occasionally, as in Sagan's more rhapsodic moments, openly channels the very theological sensibilities it ostensibly transcends. The Tree of Life used in this episode of *Cosmos* exemplifies how imagery and language are used to construct meaningful, religious-like and theological-like themes from purely materialist positions. Poking at the theistic Epic of Evolution, arguing from nature to God—the classic example from Paley's Natural Theology—Tyson asks the viewer to "consider the human eye—a masterpiece of complexity" (21:15). Using the available mass of fossil evidence, the teams of animators and artists created a magnificent sequence of all the stages of eye evolution, as currently theorized, in a digitally rendered visual history. The audience's screen is split in half—one side is the evolution of lifeforms with eyes, and the other half estimates what the lifeform could see.

To begin this sequence, Tyson mimics biblical language. "In the beginning, life was blind" (22:16). Since UV radiation is damaging to organisms and the early Earth had no protective stratospheric ozone layer, it is inferred that the first step of the eye was a light-sensitive pigment that allowed the organism to detect when light was strong or weak, allowing the organism to find the dark areas where UV radiation would not kill it, thus providing an environmental advantage. Here, Tyson again says something reflective of biblical language; what this amounts to, he suggests, is "night and day" (23:04). These deliberate choices illuminate how the creative team approached the design of this sequence. The sequence is important because it demonstrates how the scientific consensus understands the evolution of the eye and, by extension, of sight. But more importantly, by using language

that reflects biblical prose, the audience may understand the narrative's significance or realize that the narrative being presented to them may be as meaningful, perhaps offering a renewed perspective on life's complexities. The Bible, taken literally, presents creation as occurring in six days, with the seventh day set aside for rest. Here, we see the reflection of that telling but from a materialist position.



A visual of what early life may have perceived, tracing the development of eyes, which both directs attention towards the clockmaker argument in Natural Theology and the day/night metaphor of Genesis through scientifically informed means. (ASO Ep. 2 - 23:10).

At this sequence's conclusion, Tyson, walking through the Kew Gardens, elaborates that the eye, though excellent, is actually adapted for the water and isn't best suited for being an air-dominant organic structure, challenging the idea that God creates in His image with maximum omnipotence, omnipresence, and omniscience. Tyson tells us that biology makes no sense without evolution. He continues, "Some claim that evolution is just a theory, as if it were merely an opinion. The theory of evolution, like the '*theory*' of gravity, is a scientific

fact. Evolution *really* happened" (27:45), mirroring what Sagan said in *A Personal Voyage*. However, Tyson adds, "Accepting our kinship with all life on Earth is not only solid science, in my view it's also a soaring spiritual experience" (27:55).

These final words are another critical example of the narrative framing that *Cosmos* uses in its story. Recall earlier when I called attention to Ecklund's (2010) work, noting the growing group of individuals who identify as "spiritual entrepreneurs" and "spiritual but not religious." The narrative strategies deployed in this passage—the rejection of institutional religion combined with the affirmation of cosmic wonder as a source of meaning—align with the orientations articulated by Ecklund's (2010) SBNR respondents. I argue that this does two things. The first is that it creates space for those seeking an alternative to religion. The growing SBNR numbers appear to track broadly alongside the drop in church attendance and traditional religious adherence, though the causal relationship between these trends is complex and mediated by a range of social, generational, and political factors that resist any simple one-to-one correspondence (Voas 2025: 13). The weakening of God-as-concept will be explored in more detail in the next chapter, but in brief, it is important to highlight here the trend of God as less of a relevant option and the increasing personal commitment to what are considered secular ideals (Voas 2025: 16).

The second is to drive home the power of science to inform and benefit us, which I would agree is very much like the other grand narratives discussed in this chapter. But it pushes past this similarity in that the knowledge and benefit are meaningful in registering a material view of the Cosmos as the source of our good fortunes—the gift of life. The natural world is akin to us, and we are akin to it. There is no recourse for God, or spirits, or any other being. It is a call to action in a secular, materialist, yet meaningful experience of the natural world, a view of what science can offer that Carl Sagan began. Here, science is more than

disproving old thinking; it is a means of knowing the exquisite relationships and subtle truths that connect everything and everyone.

This call to action is most evident near the end of the episode, when Tyson kneels beside pools of volcanic-heated water. He tells us,

> Nobody knows how life got started. Most of the evidence from that time was destroyed by impacts and erosion. Science works on the frontier between knowledge and ignorance, we're not afraid to admit what we don't know. There's no shame in that. The only shame is to pretend that we have all the answers. Maybe someone watching this will be the first to solve the mystery of how life on Earth began (40:43).

There is a humbling call to action in *Cosmos* and, more generally, in the Grand Cosmic Narrative, compared to the Epic of Evolution and the Humanist Blockbuster. *Cosmos* doesn't shy away from the fallibility of scientists and policymakers; it doesn't hide the wrongdoing that has occurred under the label of science. It does so to invite everyone to join in the processes that science holds as common, "a simple set of rules" (Druyan et al. 2014), introduced in the first episode of all three *Cosmos*: "Test ideas by experiment and observation. Build on those ideas that pass the test, reject the ones that fail. Follow the evidence wherever it leads and question everything" (Druyan et al. 2014). By joining the processes of science, we open ourselves to a consciously reflective way of navigating the world, where the actions we take and the choices we make are motivated by the call to knowledge derived from that simple set of rules.

To end the episode, Tyson shares with us the words that inspired the title of this episode—"Some of the Things Molecules Do." "In Carl Sagan's original *Cosmos* series, he traced the unbroken thread that stretches directly from the one-celled organisms of nearly four billion years ago to *you*. Four billion years in forty seconds" (41:22). The screen shows the Milky Way Galaxy, with a hand-animated morphing image of an organism that starts with a one-celled organism and ends with a human

female. When the animation is over, the Tree of Life fades into view, and we hear Sagan's voice from the original series tell us, "Those are some of the things that molecules do, given four billion years of evolution" (42:25). Fade to black.

Conclusion

This chapter has explored grand narratives with particular attention to those that adopted scientific knowledge as the central premise, from holistic, systematic philosophical positions in the 18th century to the Epic of Evolution in the 19th century and the Humanist Blockbuster in the 20th century. We explored these narrative genres to examine how science has been employed to give meaning to people's worldviews and cultures of the time. This has been informed by the Complexity Principle, which has allowed us to glimpse the interactions between science and religion within the context of the North Atlantic world during those periods mentioned above. I drew attention to grand narratives of science, specifically the Epic of Evolution, which are broad enough to be widely applicable. However, I argued that it may not encompass the Grand Cosmic Narrative due to historical, cultural, and textual factors. In *Vestiges* and *Other Worlds*, this quality was evident because it was situated in a time when God was absolute and the architect of their universe. Some, such as *Kosmos* from Alexander von Humboldt and Arabella Buckley's *Life and Her Children*, were positioned from material and spiritual views, respectively. Regardless, the narrative form of the Epic of Evolution was a novel category that would shape the popularization of science for nearly two hundred years.

I then led us to investigate two episodes of *Cosmos*, one from the 1980 version, *A Personal Voyage*, titled "One Voice in the Cosmic Fugue", and the other from the 2014 spiritual reboot, *A Spacetime Odyssey*, titled "Some of the Things Molecules Do". In doing so, I tried to highlight both the aspects of the story that were similar and those that were different. I emphasized the importance of storytelling and its thematic incorporations, and the

significance of the visual and audio aspects of the story being told, aspects that are almost absent from the Epic of Evolution, as historians of science have detailed. This difference is crucial, as it will create a stronger emotional resonance with the audience, which we will explore further in Chapter Four.

My argument for this project is that *Cosmos* occupies a hybrid zone where the reality of the physical world touches upon the inexplicable emotion customarily associated with religion or spiritual practice. That *Cosmos* occupies such a hybrid zone is, I suggest, precisely what allows it to function differently from the conflict thesis but also what limits its capacity to displace that thesis. The conflict thesis thrives on clarity, on sharp binaries, on the rhetorical convenience of mutual exclusion. A hybrid zone, by definition, resists such clarity; it offers nuance, ambiguity, and the productive discomfort of holding multiple commitments in tension. These are virtues in the seminar room, but they are not always virtues in the arena of popular persuasion, where simpler narratives, however inaccurate, tend to carry the day. The GCN's hybridity is thus both its intellectual strength and, perhaps, the source of its limited capacity to reshape the broader discourse.

This is perhaps made clear by Wend-Walker (2011), who claims that such texts are drawing "from religion, while partially displacing it with a non-symbolic, technologically derived (and hence, seemingly more real) secular counterpart" (187-188). This is achieved by reframing the narrative as a call to action and, more importantly, by being a television screen, which gives the story greater emotional depth. I put forth that *Cosmos* is of what we might call a secular-transcendent quality, by which I mean that it deploys the rhetorical and affective registers traditionally associated with religious transcendence—awe, wonder, a sense of cosmic significance, intimations of the numinous—while grounding these experiences entirely within a naturalistic framework. The term is deliberately paradoxical, capturing how the GCN occupies a liminal space between the secular and the sacred. To

clarify the philosophical underpinnings of *Cosmos* and to identify theoretical propositions explaining why this form of narrative emerged, my task in the next chapter will be to build a theoretical framework for hypothesizing about the cultural and psychological shifts that occurred as these epics began to take shape.

I will ultimately seek to illuminate the Grand Cosmic Narrative as the descendant of the Epic of Evolution, which shares similar roots but is sufficiently different to merit classification as its own narrative form. The differences in scope, medium, and narrative structure catalogued in this chapter are, as Chapter One established, enabling conditions rather than the constitutive features of the genre. What they enable—the production of a durable existential orientation through affect-rich narrative—has been visible throughout the content analysis in this chapter's observations of Cosmos's "biblical cadence," its metaphysical claims, and its deliberate cultivation of wonder and awe. Chapter Three will develop a formal taxonomy of the distinct registers of enchantment through which this orientation-producing function operates, providing the analytical precision that the present chapter's observations require.

Chapter Three
‘A Secular Age’

We’re made of Starstuff. We are a way for the Cosmos to know itself.

— Carl Sagan, Cosmos

Introduction

Up to this point, I have discussed *Cosmos* and its background, including highlighting its creators, Carl Sagan and his wife and collaborator, Ann Druyan. Then, in Chapter Two, I provided a historical overview of the grand narratives of science that have been prevalent in science popularization/communication since the 19th century, notably Robert Chambers’ *Vestiges of the Natural History of Creation.* My objective in doing these steps first has been to detail the context of these texts and genres in order to draw out the undercurrent of philosophical and political influences that motivated these projects and illuminate the contact points with religion or belief more generally. But now, having put the historical narrative work behind us, I move on to developing the theoretical scaffolding for this dissertation. With the narratives of science as the background, our task now is to think about what would allow such a narrative of science to exist in the first place.

I will share my conclusory aim now so as to reveal my plan in the chapter: secularization has seemingly disenchanted the North Atlantic world, yet narratives of science, in an attempt to re-enchant, reoccupy traditional faith-based positions by being of a secular transcendent quality, as grand narratives of science are but one option for meaning among

many. I understand that sentence may be difficult to grasp at this moment; the objective of this chapter is to provide as much detail as possible to illuminate my argument and make that sentence clear, which I will revisit at the end of the chapter.

To achieve this, this chapter will lead us through what I claim are the cultural forces at work. Recalling Jean-François Lyotard's postmodernism, where he insisted that grand narratives, influenced by the explanatory power of science, are no longer sustainable as a cultural force, I expand from this frame of thought with Max Weber's oft-cited *Science as a Vocation* (1917) lecture in which he puts forth the now well-discussed cultural notion of disenchantment. I will then turn to Charles Taylor's 2007 work, *A Secular Age*, which the chapter title takes as its namesake. Taylor does not simply extend Weber's disenchantment thesis but critically reframes it, reinterpreting disenchantment not as a process of loss but as a transformation of the conditions under which meaning, transcendence, and belief are experienced. Building on this, I offer an overview of the term secular and its variants, secularism and secularization, from José Casanova, to address what I consider a critical intellectual move in the history of North Atlantic belief structures. I will attempt to explain how the secular programme in the North Atlantic world, though originating in theology, contributes to a sense of disenchantment. I claim that the secular programme, by transforming what Taylor identifies as the conditions of belief, generates the cultural space in which re-enchantment becomes both possible and actively sought. I contend that this is because the secular programme, in privatizing religion, has transformed the space in which meaning, purpose, and transcendence are sought—creating not a void but a contested field in which multiple options compete for the existential ground that Christendom once occupied with relative stability. The felt absence of the subjective, internal experiences once reliably provided by religion has created a demand, and the revelations of science have, I argue, become a new source of supply for spiritual nourishment.

This approach is not entirely new. Scholars have thought about this for some time. Bernard Lightman's 2002 work *The Origins of Agnosticism* details in his introduction how science made the anthropologist Bronislaw Malinowski become agnostic (2), and how the "a-gnosticism" of Thomas H Huxley (1825-1895), who formulated the term, and John Tyndall (1820-1893), William Kingdon Clifford (1845-1879), and Herbert Spencer (1820-1903), among others, was "midway between atheism and theism" (17) and was considered an "equivalent for religion by some" (18). The late Mary Midgley (1919-2018) also wrote three books on this subject: *Science as Salvation: A Modern Myth and Its Meaning* (1992), *Evolution as Religion: Strange Hopes and Stranger Fears* (2002) and *The Myths We Live By* (2004). In each, Midgley has warned readers to keep science and salvation distinct. We need myths, she concedes, but they must be recognized as stories that orient our values, not as confusing experimental results with scientists' hopeful or personal opinions. Michael Ruse also wrote on this in his *Darwinism as Religion: What Literature Tells Us about Evolution* (2016), where he traced the road from Darwin's *Origin* to 20th-century opposition to religion, including E. O. Wilson's Epic of Evolution as a cultural shift from religion to skepticism and to science-as-religion thinking. Even Galileo Galilei (1564-1642), writing to the Grand Duchess Christina in 1615, cited Caesar Baronius, "That the intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes" (Galilei 1615: 5).

However, my approach differs from these, and I will return to those scholars and expand on this claim in the last chapter. In brief, my aim is different in that, first, my goal in this chapter is to examine the cultural underpinnings that open space for narratives of science to adopt a religious-like affect in their presentation. Second, and most critically for the argument that follows, I am concerned with science as an enterprise of human flourishing, not science *as* religion. This distinction requires brief elaboration, as it underwrites the analytical posture of the entire dissertation. Mary Midgley, Michael Ruse, and Lisa Sideris each

approach narratives of science with a normative suspicion: that to invest science with existential significance is to commit a category error, elevating an epistemic enterprise to a status it cannot and should not occupy. Their concern, in different registers, is with what Sideris (2017) calls the "consecration of science"—the transformation of scientific knowledge into sacred authority.

I share their vigilance against scientism, and the analytical framework developed in this dissertation provides specific resources for distinguishing the GCN from it. Scientism, as Voegelin (1948) defined it and as I detailed in Chapter Two, holds that all realms of being are accessible to the methods of natural science and that whatever is inaccessible to those methods is irrelevant or illusory. The Grand Cosmic Narrative, as the content analyses demonstrate, does not make this claim. Its relationship to the limits of scientific knowledge is structurally different from scientism's, and the enchantment taxonomy developed later in this chapter makes the distinction precise—though a brief introduction here is necessary. Enchantment of the unknown—the affective register in which mystery is sustained at the frontiers of knowledge—functions as an epistemic limit-condition within the GCN: it foregrounds what science has not yet explained and frames the unknown, not as a temporary deficiency to be overcome, but as a permanent, generative horizon that sustains wonder. This is the opposite of scientism's closure. Enchantment of the revealed—the awe at what science does disclose—operates within the domain of empirical knowledge but invests it with existential significance through narrative framing, not through the epistemological claim that scientific knowledge exhausts reality. The GCN, in other words, treats science as a powerful but bounded source of meaning, not as an all-encompassing epistemology. The distinction between the GCN and scientism is not merely one of tone or intention, but of epistemic structure: where scientism forecloses non-scientific knowledge, the GCN's enchantment of the unknown actively preserves it as an open horizon.

The Grand Cosmic Narrative, as I will demonstrate through the content analyses that follow, does not claim that science is a religion or that it should replace religion. It does not establish doctrines, demand confessions of faith, institute liturgical practices, or claim access to revealed truths in the theological sense. What it does is demonstrate that the narrative framing of scientific knowledge can perform cultural work—meaning-making, moral orientation, affective cultivation, communal belonging—that has historically been associated with religious traditions, without thereby becoming a religion in any institutional, doctrinal, or liturgical sense. The distinction is between functional analogy and ontological identity. A secular narrative may reoccupy the answer-positions that theological narratives once held, as Blumenberg's framework theorizes, without the content that fills those positions being religious in nature. To claim otherwise would be to conflate the position with its occupant, precisely the error that Blumenberg's concept of reoccupation is designed to prevent. It is this functional register—what the GCN does rather than what it is—that aligns it with the enterprise of human flourishing rather than with the enterprise of religion, and it is this register that the subsequent chapters will investigate. Lastly, I intend to develop a framework for understanding how science narratives have come to function as available options for meaning-making among those for whom traditional Christian claims have lost plausibility—the cultural space that Taylor's analysis of secularity 3 identifies.[11] As Ecklund (2010) outlined in her study, over 20% of the 1700 respondents of elite-institution scientists identified as spiritual but not religious (SBNR), and of those, 40% were "spiritual entrepreneurs," those "looking for new ways to hold science and faith together yet still free of the constraints of traditional religion" (Ecklund 2010: 51-54). Therefore, I believe such a position is inherently secular; let us now examine what the secular entails in detail.

[11] We will return and identify this later in the chapter.

The Secular: Definitions and History

Secularism is a fascinating term in that, as with the popular mind's identification of a conflict between science and religion, the complexity of the word's history in everyday use is obscured. José Casanova (1951-), a sociologist of religion at Georgetown University, has spent his career writing on the secular, secularism, and secularization. He has argued that the secular is both a central and modern category differentiated from "the religious", noting that there is an assumption that secular refers to the 'other' of religion – the nonreligious (Casanova 2011: 74). But Casanova is quick to note the paradox of such an assumption, in that the secular in practice has become "the whole of reality, in a sense replacing the religious" (Casanova 2011:55), in other words, a worldview of its own.

Casanova, however, stresses that the secular has undergone numerous shifts in meaning throughout history, as have the terms "science" and "religion"—a point Harrison (2015) develops at length. In classical Latin, *saeculum* denoted an age or generation, a span of worldly time (Casanova 2011: 76). What would become its contemporary sense—the secular as the counterpart and eventually the other of the religious—took its initial shape in the Middle Ages, when the term came to mark one side of the Christian "binary system of classification separating two worlds, the religious-spiritual-sacred world of salvation and the secular-temporal-profane world" (Casanova 2011: 76). "To secularize," in turn, originally referred to the transfer of ecclesiastical property or persons to lay jurisdiction, a juridical sense that gradually broadened into the more general "making worldly" recognizable today. Yet secularization in this broader sense does not simply evacuate the theological. It can also normalize cultural conditions that preserve theistic structures in secular form rather than displacing them.

While our present-day world may appear relatively 'worldly' compared to historical ideals, Casanova, citing Taylor in his seminal 1998 essay "Modes of Secularism", details

three orders of perspective most influential in structuring worldviews—cosmic, social, and moral. Importantly, however, Casanova claims that these orders are now "devoid of transcendence" and function "*etsi Deus non daretur* (as if God would not exist)", making "our age paradigmatically…a secular one" (Casanova 2011: 79). Casanova argues that secularism's inherent entanglement with ideals of modernity produces a normative framework in which to be religious is not to be thoroughly modern, a framework that, in turn, reinforces the North Atlantic world's historical self-understanding as the paradigm of self-perceived secular modernity, enlightenment, and progress (ibid.). Casanova claims that "this secularist stadial consciousness is a crucial factor in the widespread secularization that has accompanied the modernization of Western European societies" (Casanova 2011: 80).

Understanding the theological origins of the secular clarifies how the differentiation between the secular and the religious operates. Casanova argues that "the religious" is itself "a product of Western secular modernity" (Casanova 2011: 82): the category does not precede the secular as its independent counterpart but emerges through the very processes of differentiation that produce the secular. "The religious" and "the secular" are thus co-constituted within modernity, with the generic, comparative sense of "the religious"—religion as recognizable across traditions—being the more historically novel construction. Secularization, in Casanova's account, names the historical processes of "transformation and differentiation of 'the religious' … and 'the secular'" (Casanova 2011: 74). Across the globe, the religious has maintained its presence in defiance of secularizing theses of the mid 20th century like that of Berger (1967), and beginning in isolated pockets but now seemingly more widely, has become a recognizable global pattern that has shaped our present reality (Casanova 2011: 83).[12] Understanding that secularization has occurred outside of the North

[12] On these dynamics in contemporary Europe and the United States, see Atalia Omer and Joshua Lupo (eds.), *Religion, Populism, and Modernity: Confronting White Christian Nationalism and Racism* (University of Notre Dame Press, 2023). For a more engaged argument on the role of secularism in

Atlantic world prevents being fooled into believing secularization is a strictly Western process. Instead, it can be understood "as ongoing mutually constituted global processes" (Casanova 2011: 85). For us in the North Atlantic world, this means something very different from what it does for those in, say, Islamic or Hindu territories.[13] For example, in places like the UK, France, and Canada, the secular has *become* religious in many ways, with conflicts surrounding what I will label here "sacred-secular" things, with examples such as legal codes, freedoms, and privileges being prominent today. This is perhaps most clearly expressed in the 2022 "Freedom Convoy" in Ottawa, Canada, or in the "Culture Wars" claim that freedom of speech is under assault.

I will return to this below, but I think it is important to elaborate on the sacred-secular in a little more detail here. Sacred-secular things can be understood more broadly as shared adherence to and reverence for human-created rules, values, and laws, in opposition to theological equivalents, such as divine laws and the commands directly revealed by God through scripture, such as the Ten Commandments, that guide toward salvation beyond the limits of natural reason. Further, for most of the Christian history of the continent, political authority in Europe rested on divine right: monarchs like King James I were held to derive absolute, God-given sovereignty, unaccountable to any earthly power. Only later does rights-talk come to be grounded in instruments like the United Nations' Universal Declaration of Human Rights (1948)—life, liberty, equality before the law, freedom from discrimination. Secular-sacred things have similar influence and power, as evidenced by the many freedom-of-speech gatherings organized by groups such as the Foundation for Individual Rights and Expression (FIRE) and, to some extent, Turning Point USA. The fervour that these human-

religious identity and politics, see Tobias Cremer, *The Godless Crusade: Religion, Populism and Right-Wing Identity Politics in the West* (Cambridge: Cambridge University Press, 2023).

[13] See Jocelyne Cesari, *We God's People: Christianity, Islam and Hinduism in the World of Nations* (Cambridge: Cambridge University Press, 2021).

derived principles arouse gives them a sacred quality, but they are, in the understanding being written about in this chapter, of secular origin.

For Casanova, secularism is the whole broad range of worldviews and ideologies that fall under the secular programme that have become philosophies of history and the "normative-ideological state projects" of a modern and 'cultured' society (Casanova 2011: 87). Casanova looks specifically at secularism as a statecraft principle because understanding it as "simply some principle of separation between religious and political authority" brings out the raw tension that presently exists between the Church and the state (ibid.). The boundaries drawn between Church and state that create such tensions are founded upon popular yet dismissively shallow understandings. These tensions are contributed to by the fact that the public, as the space where politics operates, is secular and therefore essentializes the religious. For example, driven by the popularity and publicity of New Atheists (Stenger 2009: 15), the popular mind identifies religion as intolerant (Stenger 2009: 69), but in fact, the most devastating atrocities in human history—World Wars One and Two—occurred within a context shaped, at the very least in part, by secular-associated ideals, though the causal picture is far more complex than any single-factor explanation can capture. Nationalism, imperialism, ethnic hatred, economic crisis, and a host of other forces—some secular, some drawing on quasi-religious fervour—converged to produce these catastrophes. This acknowledgment is overlooked to protect Western societies' perceptions of progress and achievement. However, some examples in Western society demonstrate that the state is not *truly* secular. That the Church of England and Scotland remain directly under the authority of a monarch who is also the head of both states, or even that, in France, a state formed in its modern form by the secular regime, still funds 80% of private Catholic schools under the Debré Law of 1959.

Writing in the same volume as Casanova, Charles Taylor's influential essay "Western Secularity" analyzes how the secular is informed by "taking a word itself too seriously" (Taylor 2011: 45). Taylor, too, exposes the various meanings of "secular" throughout Christian history. Originally, "secular" was "one term of a dyad" (ibid.): the first was profane time, roughly a century, while the second term referred to the eternal, or sacred, time. When the Reformation began in 1517, the meaning of secular began to shift, moving those dyadic poles closer together and slowly diminishing the absolute control of the clergy over to the laymen. This change in the structure and source of power, the authority of meaning, brought about a new conception of "good social and political order" that lay in an outlook of mutual benefit that was grounded in this world, lived reality, and not a metaphysical space (Taylor 2011: 46).

This led to a firmer distinction between the transcendent and the immanent/secular, where the dyad's shift from the internal to the external world also led religion to shift from an external, public, all-encompassing institution to one that was internal and relegated to the private. Following the French Revolution (1789-1799) and the revolutionaries' fight to exclude the Church from the state, religion came to be seen as a valuable tool in maintaining social order, but only if it remained withdrawn to the private and kept weak and in-check to avoid becoming a challenge to the newly established power which the French Revolution had won (Taylor 2011: 49). Other nations in Europe witnessed this drastic and deadly event and were quick to move to affirm control over their people in fear of revolution, losing power, and death.

As did Casanova, Taylor affirms that the secular is a Christian term originating in '*saeculum'*, referring to a period of about a century (Taylor 1998: 31). Understanding this temporal dimension, and that time is an often discussed and central theme within Christian theology (Kierkegaard [1844] 1985; Craig 2001 and 2021; Swinburne 2004), we can see how

time is analogous to a metaphorical coin, where the whole coin represents humanity and each side represents a different aspect of time – profane and sacred. These two sides symbolically represent humanity's unique position in God's Creation: a human is born, lives, and dies all within the profane, physical world, and yet is still bound to God's will and purpose in the sacred (the supernatural, 'magical' elements of religion, such as the soul and heaven). This symbolic representation of time—the tight weave of the '*saeculum*' with the 'higher' time—was also symbolic of one final dualism: "a requirement of distance, of non-coincidence between the Church and the world" (Taylor 1998: 32).

Taylor argues that the 'distance between the Church and the world' is an essential component of the process of secularization, for it was responsible for the secularism known today. Taylor claims this takes shape during the Thirty Years' War, which dominated Europe from 1618 to 1648. An entire generation paid witness to hunger, blood, disease, and death, leaving a bleak melancholy across most of Europe as an estimated 5 million people died, most of them civilians (Besouw and Curtis 2022). Eventually, the monarchs became desperate for peace as the peasants who supported their wealth and lifestyles dwindled. This meant that Europe had to find a way to coexist with the diverse Christianities that emerged after the Reformation. According to Taylor, two options were present: the first was the common ground strategy, based on the doctrines common to all of Christianity, while the second was an independent political ethic based on norms of the human condition – i.e., non-Christian (Taylor 1998: 34-36). But weaknesses plague both options. A problem with the common ground approach is that the common ground, whatever it may be, is difficult to recognize, especially during a period when the multiplicity of ways of being, metaphysically through religion and physically through culture, was increasingly crowded. As for the independent political ethic, the notion of an "independent ethic" is grounded in Christian

ethics of selfhood and a personal deity, thereby stripping the approach of legitimacy (Taylor 1998: 34-36).

The difficulties of these two historical options left what Taylor calls, borrowing from Rawls, an "overlapping consensus" (1998: 38). Instead of relying on a commonality amongst the plurality, or the idealistic and false notion of independence through a common human condition, whatever that may be, an overlapping consensus lifts these requirements and "aims only at universal acceptance of certain political principles" (ibid.). Taylor claims that overlapping consensus, the one chosen, was the best option, and can be used "almost anywhere", even going so far as to suggest that its use today would help eliminate the congested political processes being caused by the increasing multitude of available ideologies (ibid.).

Moreover, given that the modern state is inescapably secular, Taylor, borrowing Benedict Anderson's (1983) phrase "imagined communities", explains what he identifies as two key features of the imagined community of the secular state (1998: 38). The first is the shift from hierarchical, mediated-access (i.e. a peasant to a lord, and a lord to a king) to horizontal, direct-access (i.e. intermediary organizations managing the wider society); and the second feature is a state no longer "seeing" something as "higher" for providing purpose and meaning in life and behind action because secular time has replaced all others. In becoming the only time, the metaphysical basis for belief, value, morals, meaning and purpose, is derived from and functions in the tangible and mundane (Taylor 1998: 39). The "higher-ness" of Taylor's analysis, the elements of life that were transcendent, were now, matching Casanova, transferred to the state.

This describes the process of creating secular-sacred objects. In the transfer of the transcendent highness from the divine to the state, the translation of this transfer raises the question of why God remained central to Christian nations throughout their historical journey

to the present. If the state were transcendent and one could put their hopes, fears, values, and meaning in it, could they no longer do so in God? Obviously not, as Christianity has remained a dominant force in the world to this day. Taylor offers an answer to this problem in his most influential and controversial work, *A Secular Age* (2007). In it, Taylor is concerned with how an individual recognizes themselves in relation to the transcendent and the secular. He identified three variations or understandings of the secular. The first is that of public spaces. A second is the removal and absence of the religious. The final, and the one Taylor concerns himself with in his book, is the conditions of belief.

The transition detailed above was an essential step in reshaping the conditions of belief, which not only moved the transcendent from the abstract to the more tangible but also changed how the self was understood. Taylor posits two distinct ways of relating to the world. In the time of enchantment, before the rationality of the Enlightenment and the progress of science, Taylor claims that people were "porous". By "porous," he means that people were susceptible and open to the world in a way a modern person could not be, since a modern person would be "buffered" from such influence. To be porous is to understand the world as an arrangement of forces that are beyond understanding and to be connected with the beyond in intimate ways. The now classic example Taylor provides is melancholy. He explains that for the pre-modern person, "black bile is not the cause of melancholy, it embodies it, it *is* melancholy. The emotional life is porous here; it doesn't simply exist in an inner, mental space. Our vulnerability to evil—the inwardly destructive—extends beyond mere malevolent spirits. It goes beyond them to things which have no wills, but are nevertheless redolent with evil meanings" (Taylor 2007: 37).

Black bile *is* melancholy. The world of the pre-modern, the world of porous folk, is imbued with meanings that place one in the midst of a world of mystery, a world where greater cosmic, otherworldly forces take hold of the very ontology of one's idealization of

self. That black bile is melancholy signals the profound shift in worldview and existential condition at stake in Taylor's work. Where in the past the physical and the moral were one, today they are distinctly drawn apart. The porous self was inherently social, drawing on others to imbue it with magical protections that kept spirits and evil forces at bay. This is articulated by the church's necessity and the act of lighting blessed candles, a practice still observed today. The porous self is most affected by what is "outside of the mind," as there is no boundary between the self and the world at large. They are, more or less, one and the same.

In contrast, the moderns, with their science and their worldly disposition, are buffered. For Taylor, this means, still using melancholy as the example, that "a modern is feeling depressed, melancholy. He is told: It's just your body chemistry, you're hungry, or there is a hormone malfunction, or whatever. Straightaway, he feels relieved. He can distance himself from this feeling, which is *ipso facto* declared unjustified. Things don't really have this meaning; it just feels this way, which is the result of a causal action utterly unrelated to the meaning of things" (2007: 37). The modern is distanced from the affect of the feeling. There is a buffer between the cause and the effect. A modern *feels* melancholy the same way a pre-modern did, but now there is a distance—a buffer—between the feeling and the cause. What was once the symbolic representation of shameful, maybe sinful, vices in one's life, such as excessive wine drinking and gluttonous behaviours, was now attributed to rationality and scientifically informed causes (Midelfort 1999). The body is at fault, not the mind. Rooted in a mechanistic Cartesian philosophy, the meanings of the illness are out, and the identification of the specific mechanisms at fault in the body is in. The buffered self pushes the blame away so that it isn't any fault of one's own, but of their biology, their chemistry, or their social and/or cultural circumstances.

These existential changes in one's disposition toward the world, and the world's hold on the self, tied to the transition in the nature and meaning of time detailed above, are a critical step in the secularizing process. As the conditions of belief became increasingly rooted in worldly mechanisms, and the political and economic institutions of the past transitioned into new forms and adaptations, the North Atlantic person was confronted with new possibilities and sources of meaning and transcendence. In other words, as Taylor argues, "the shift to secularity in this sense consists, among other things, of a move from a society where belief in God is unchallenged and indeed, unproblematic, to one in which it is understood to be one option among others, and frequently not the easiest to embrace" (2007: 3). God, then, becomes *optional.* In the wake of social, political, and scientific change, as relations between people and institutions altered, as culture changed alongside the milieu of the times, new sources of meaning, new sources of hope, new sources of connection were created that either complemented—as in the case of Buckley and Wallace—or replaced entirely—like Huxley—theist belief. These options take shape within what Taylor calls the immanent frame—the shared structure, built up over the long arc since the Reformation, within which belief and unbelief alike now operate. Exclusive humanism, accepting no final goals beyond human flourishing, is one position the frame makes available, and is the option Huxley takes. But it is only one. Remaining theistic, or occupying one of the many locations between firm belief and firm unbelief, are also options the same frame holds open.

The conditions for this optionality are, for Taylor, anthropological as much as historical. As the processes of reform and social transformation reconstituted and influenced the formation and experience of selfhood, what Taylor calls the "buffered self" emerged: an understanding of the self as possessed of an interior life increasingly insulated from direct transcendent influence. Whereas the "porous self" was open to, and acted upon by, spiritual forces and cosmic meanings as in the black bile example, the buffered self encountered these

as distant, as matters of interpretation, rather than immediate experience. This buffered self operates within what Taylor terms the "immanent frame", an important concept in the Taylorian framework. The immanent frame is the constructed space of complete possibility, the field from which, much akin to Pierre Bourdieu's habitus (1993), we "collectively imagine" (Taylor 2007: 146) "the ways we are able to think or imagine the whole of society" (156), the "deeper normative notions and images which underlie these expectations" (171) in our "contemporary Western world" (156). Within this frame, transcendence is not necessarily denied, but it is no longer inevitable—it is optional. It is this configuration of the buffered self within the immanent frame that makes exclusive humanism livable as a default orientation rather than merely thinkable as a philosophical position.

Taylor uses the capital 'R' 'Reform' to signify a recurring impulse traceable to high medieval Catholicism, intensifying through the Reformation and continuing to the present. Reform, as opposed to reform, is the meta-narrative, the grand-narrative, of the drive towards a total higher moral and lived standard. So, while reforms in cultural institutions and organized groups took place across Europe during the Reformation, Taylor points to the undercurrent—the overall objective of the ideals of progress and the "spirit" of human development. This, for Taylor, is a significant contributing factor in "the destruction of the old enchanted Cosmos, and to the creation of a viable alternative in exclusive humanism" (2007: 63). The more the ideal of human progress, in a teleological function, took hold, the more in turn it inspired a sense of self-worth and self-realization that no longer needed affirmation in the divine or supernatural. Human flourishing, what Taylor refers to more frequently as "fullness", could be achieved by human means alone.

This, of course, was also influenced by the increasingly grander, more all-encompassing, and faster pace of scientific findings and developments. Taylor is careful to point out that he is not telling a "subtraction story", "stories of modernity in general, and

secularity in particular, which explain them by human beings having lost, or sloughed off, or liberated themselves from certain earlier, confining horizons, or illusions, or limitations of knowledge" (2007: 22). In other words, developments in philosophy, anthropology, history, culture, and science generally, eradicating belief and religiosity is not Taylor's point. He is careful, mainly, to carve out the space in which epistemic changes relate to the ideation of those changes and to their effects on the conditions of a worldview. But here we face the same problem that I introduced in the beginning.

While Taylor may be careful to point out that adding scientific knowledge, or knowledge of intellectual pursuits more generally, does not subtract from religion and belief, the conflict narrative still holds in the popular mind, and the culprit is typically identified as science. This observation—that the conflict narrative retains its hold despite decades of scholarly refutation and the extraordinary cultural reach of narratives like the Grand Cosmic Narrative, which operate according to a different logic—demands more than a passing acknowledgment. Why has a narrative viewed over a billion times not loosened the grip of the conflict thesis? I would suggest that the answer lies in the structural character of the conflict thesis itself; it is sustained not primarily by media representations but by deeper institutional and political dynamics—the culture wars, the polarization of American public life, the strategic utility of the conflict framing for actors on both sides of the science–religion divide who popularize and/or profit. A television programme, however brilliant, operates at the level of cultural storytelling; the conflict thesis is embedded in social structures.

Unfortunately, Taylor doesn't spend much time on the idea of conflict, but he does argue late in *A Secular Age* that the reason for conflict is that science, which built up its knowledge especially in the 18th and 19th centuries, is much closer in the secular time detailed above, and is *ipso facto* at odds with knowledge derived from the transcendent time. Taylor's analysis cuts to the heart of a tension in the argument I am building. If the conflict between

science and religion is structurally embedded—woven into the very fabric of post-Enlightenment Western modernity—then it follows that no single counter-narrative, however widely disseminated, could reasonably be expected to dislodge it. The Grand Cosmic Narrative, on this reading, operates not as capable of dissolving the conflict thesis but as what Taylor might call one option among many within the 'nova effect'—the modern proliferation of belief positions that characterizes our secular age. The GCN offers a genuine alternative to the conflict framework, but it does so within a pluralized landscape in which the conflict framework itself remains a powerful and, for many, a default option.

If Taylor's argument holds, then the perceived reality, the subjective engagement with these two epistemic cultures, with the transition to secular time, means that transcendent time and the knowledge derived from it *could be* viewed as "old school", "dated", "stuck in the past". I don't think Taylor suggests that such thinking is correct, and in fact, he received sufficient criticism for his work's final chapter being Catholic theological apologism, but it is in line with his argument of belief in the Divine becoming optional, thinking that religious faith and religious moral values and ritual could be considered as from an earlier time. This is not an absurd argument and has representation in the reality of the Academy today, the so-called source of elite liberal thinking. While not to the same extent in the United States or the United Kingdom, in Canada, it is much rarer to find a university with any religious affiliation or theology and divinity departments. However, some, like the University of Toronto, do. In the US and UK, while they do exist, they are primarily found in "elite", private institutions with hundreds of years of history, such as Oxford, Harvard, Yale, and Cambridge. Among institutions that do have them, the general student body and even some faculty are moving away from religiosity (Downey 2017) or are hostile to religion (Ecklund 2010), which makes the numbers for those departments and affiliations nearly or almost entirely statistically negligible, even as they may exercise an intellectual influence disproportionate to their size.

Running in the background of all of this is something that Taylor is committed to throughout *A Secular Age*—the disenchantment of the North Atlantic world and its role in secularization. The secular, in Taylor's third and investigatory sense, becomes possible within the immanent frame—the structure that does not eliminate belief in the transcendent so much as render it one option among others, contestable yet no longer default. Older construals in which supernatural forces were woven through daily life have not vanished; they have been reframed, and the impulse behind them is often found elsewhere—in art, in romanticism, in aesthetic experiences. This is why a sick man on the street yelling at nothing is now most readily understood not as 'possessed' by some otherworldly force, but through biological and neuro-chemical imbalances and dispositions largely outside his control—though the older reading remains available to those who would still choose it, for example, some of those in traditional, conservative religious circles. The relegation of the religious and the transcendent to the private sphere—the congregation, the home, the bedroom prayer—and their replacement in the public sphere by open, Enlightenment values means that our relation to that sick man is no longer a moral or personal one. Taylor's own example is the melancholic. Where black bile was once itself the gloom—a substance whose meaning acted directly on a porous self—the buffered self sees only brute matter, with the meaning supplied from within. The sick man on the street stands in the same relation to us: his condition construed in factual, epistemic terms rather than moral or personal ones.

However, I would argue that the distance between the man and his neurological disease is also reflected in the distance between the sick man and society at large. Disenchantment, running in tandem with secularization, places the burden of the sick man not on the people around him, but squarely on himself. To be secular is to be individualized, to be solely responsible for one's own flourishing in society. The common interventions offered to the sick man, to "seek help," to "get a job," to "do the work," all fundamentally amount to

'folk psychology' answers that locate both the problem and its solution within the individual. This individualizing logic operates across the political spectrum, though it manifests differently: on the right, it takes the form of moral exhortation toward personal responsibility; on the left, it appears as what Illouz (2008) has termed the pervasive "therapeutic discourse" that transforms structural suffering into problems of individual emotional management. Fisher described this broader phenomenon as the "privatization of stress": the process by which political and social problems are reframed as personal pathologies requiring individual remedy rather than collective response (2009: 19). Both orientations, however different in tone, share an underlying assumption that the sick man's recovery is principally his own project. Nikolas Rose (1999) has shown that the psychological disciplines have oriented themselves toward a function akin to a technology of governance, producing subjects who understand their suffering as a private matter to be managed through expertise rather than as the responsibility of the sufferers' community of relations.

On the left, though less harsh in their tone, their claims are equally disenchanted with society, albeit for different reasons. Instead of the sick man being held accountable for his predicament, such as a life of drug abuse, it would be society that failed the man. He is not sick; society is sick, and he is but a casualty of its sickness. Services that support the man are needed; rectifying societal conditions, such as the capitalist pursuit of wealth and the hegemony of dominant culture, are sources of inequality that lead to such illnesses. But what neither political orientation readily offers is the kind of communal obligation and transcendental orientation that characterized pre-secular arrangements. This process is akin to what Philip Rieff (1966) identified as the transition from cultures organized around shared commitments to transcendent purpose toward a therapeutic culture in which self-realization, once achieved as a byproduct of communal life, is pursued as an end in itself.

It is this structural feature of secular modernity, not any particular partisan commitment, that most fundamentally produces the *conditions* for disenchantment. Both the left and the right operate within a framework where disenchantment is a dominant, though not inevitable, possibility. It is therefore my claim that secularization creates the structural conditions in which disenchantment becomes pervasive, and that this disenchantment, where it takes hold, perpetuates its own logic by distancing one from others, from the culture surrounding them, and from the world more generally. This is not to say, however, that disenchantment is the only, or even necessary, outcome of secularization, as Taylor's nova effect demonstrates; the same conditions generate a proliferation of new forms of meaning-seeking, from transformed religiosity to the secular transcendence that I argue the Grand Cosmic Narrative represents. But if disenchantment perpetuates its own logic, then re-enchantment—even the sort of secular re-enchantment attributed to the Grand Cosmic Narrative—faces formidable structural headwinds. The GCN's attempt to re-enchant operates within and against a self-reinforcing dynamic of disenchantment, which may go some way toward explaining why its cultural penetration has not translated into a broader transformation of the popular science–religion discourse. The GCN carves out pockets of re-enchantment—particularly among the 'spiritual but not religious'—without reversing the macro-level logic of disenchantment that sustains the conflict thesis.

Disenchantment is the binding thread that connects Taylor to another scholar who wrote on these issues over a century ago. Max Weber (1864-1920) and his *Vocation Lectures*, delivered in 1917 over two distinct yet thematically unified lectures, "Science as a Vocation" and "Politics as a Vocation", encapsulated much of the anxieties and melancholy that were felt in the wake of a World War that went far beyond Christmas of 1914, littering the discourses about the social and economic conditions of the time. This attitude persists, sparking a surge of writing on Weber's disenchantment, including by Taylor (Blond 1998;

Warner et al. 2010; Calhoun et al. 2011; Mahmood 2016; Bruce 2017; Copson 2017). Taylor is, to some extent, addressing Weber and his culminating works in *A Secular Age*, in that he wrestles with disenchantment as a phenomenon that has occurred, and he takes as his task revealing the cultural, historical, and philosophical constructions that allowed for disenchantment, specifically the metaphysical shift in which time becomes this-worldly. Taylor writes, "This 'time frame' deserves, perhaps more than any other facet of modernity, Weber's famous description of a 'stallhartes Gehäuse' (iron cage). It occludes all higher times, making them even harder to conceive. This will be part of my story" (2007: 59).

Taylor's engagement with Weber's disenchantment, illuminated with the broad history of continental Europe, specifically that of the "North Atlantic world" (2007: 21), is permeated throughout his argument, plainly situated in Taylor's third feature of unbelief in God that he contends with over the course of the book (2007: 25). Taylor does take seriously that "Weber's expression 'disenchantment' [is] a description of our modern condition" (ibid.), but his project is not a continuation of Weber's so much as a critical reframing of it. Where Weber treats disenchantment as a condition of loss—the progressive draining of meaning from a rationalized world—Taylor reinterprets it as a transformation of the background framework within which meaning, transcendence, and belief are encountered. For Taylor, disenchantment does not entail the disappearance of transcendence but a fundamental change in our relationship to it: transcendence becomes optional, contested, and experienced in new and often displaced forms rather than simply absent. The meaninglessness that seems to permeate our culture across all aspects of our cultural texts, from movies and television shows to music and more, is, in Taylor's framework, only one possible response within the transformed conditions of belief, not the definitive character of the age itself. For this reason, we must tackle disenchantment as Weber saw it in order to

grasp fully the structure of Taylor's argument, but we must also keep in view that Taylor substantially revises the Weberian diagnosis even as he takes it as his point of departure.

Disenchantment, Re-enchantment, and the Enchanted

Returning to Weber and recalling the context of his World War I lectures, we see that his lecture was motivated by the apparent anxiety he attributed to the rapidity and ease with which information was distributed and consumed in the North Atlantic world. While in 1917 dramatic increases in literacy, printed books, telegrams and the radio were advancing communications at an unprecedented rate, today the acceleration of information has apparently mimicked cosmic expansion as anyone can reach for their mobile device—whether smartphone, tablet, smartwatch, notebook computer, whatever—and with great ease, at the speed of light, find out nearly anything one wishes, such as the distance of the earth to the sun (149,600,000 kilometres), the diameter of Jupiter (139,822 kilometres), the years of the French Revolution (1789-1799), or the birthplace of writing (Sumer, Mesopotamia). Then and now, this has granted ever-increasing possibilities of learning something new, and, importantly, learning something from across widening spaces and times. The speed at which one can, and does, access information today is a contributing factor to the growing sense of anxiety and melancholy that Weber wrote about. Another consequence is a certain intellectual complacency. If you don't know something, use a device to find the answer (Rowlands et al. 2008; Randeree & Mon 2011). Through practice and simplicity, we are being socially conditioned to believe an answer is always available.

Weber, in his first lecture titled "Science as a Vocation," argues that the increasing rationalization and intellectualization have caused disenchantment with the world. Speaking to students and academics, Weber explained that,

> The growing process of intellectualization and rationalization does not imply a growing understanding of the conditions under which we live. It means something quite different. It is the knowledge or the conviction that if *only we wished* to understand them we *could* do so at any time. It means that in principle, then, we are not ruled by mysterious, unpredictable forces, but that, on the contrary, we can in principle *control everything by means of calculation*. That in turn means the disenchantment of the world. Unlike the savage for whom such forces existed, we need no longer have recourse to magic in order to control the spirits or pray to them. Instead, technology and calculation achieve our ends. This is the primary meaning of the process of intellectualization. (Weber 2004: 12-13)

The "conditions under which we live", argues Weber, are continually changing. There is no such thing as a static society. While some cultures have remained similar for centuries, if not millennia, to say they have not changed at all would be folly. Looking at Canada as an example, it was a colony until 1939, and before 1982, it required Crown approval for judicial and political changes. One can imagine the socio-political attitudes before and after these significant historical milestones of Canadian history. Loyalty to the crown was once a necessity, but today it is a fancy. Knowledge of the present way of life—the conditions under which one lives—is never, and can never be, known entirely to the point of actual, well-distributed knowledge. One can take whatever data may be available, organize it, and make some kind of statement about the present, but it will always be, if I may, one degree of an entire three-hundred and sixty-degree field of view, so to speak.[14]

Today, access to knowledge is available to a much wider audience than ever before, thanks to our technologies. With a few taps on a screen or clicks of a button, one may access

[14] This reflects what Weber would describe as the necessarily one-sided character of knowledge in the cultural sciences, in which value-relevance determines the selection and organization of an inexhaustible empirical reality. This is distinct from Taylor's account of the immanent frame, which functions not as one perspective among others but as the background condition that renders particular perspectives plausible in the first place. Weber's point about the narrowing social-scientific production of knowledge is a methodological claim about what empirical inquiry can achieve; Taylor's immanent frame is an ontological claim about the background structure that shapes what counts as a plausible account of reality.

nearly all the collective knowledge of the world. The most famous buildings and paintings can be digitally toured—major universities, such as Cornell or Cambridge, post lectures on their YouTube channels. Events occurring around the world are streamed instantly over the internet, and friends and family can communicate at the speed of light across the globe through voice or (digitally) face-to-face. If everything is available to be seen, heard, and known, and the boundaries of space and time are irrelevant, then waiting, anticipation, and the quiet of presence become increasingly difficult to sustain and/or achieve (Hartmut 2013).

I assert that, in today's culture at large, the character of mystery has fundamentally changed. Mystery permeated the enchanted world, and this was both good and bad; for example, the forest was a place of unknowns, where the possibility of evil spirits lingered, reflected in the myriad of fairy tales and folk stories (Taylor 2007: 32). But it was also a place where the burdens of the world were once much less known. Today those burdens are exacerbated by social media and a 24-hour news cycle that reiterates the stories perpetuating a crushing collective anxiety (Haidt 2024: 117). Mystery has not, of course, disappeared. Levinas (1987) reminds us that the Other remains irreducibly mysterious, and Latour (1993) has shown that technoscience generates new uncertainties as quickly as it resolves old ones. But neither the mystery of the face-to-face encounter nor the proliferating uncertainties of the risk society are experienced in the same register as the enchanted unknown. The forest did not require expertise to be mysterious; it simply was. Today, what remains of mystery in the older sense—the unsolved questions of nature and existence—has been largely absorbed into specialized domains, investigated by highly specialized people working in laboratories, so far removed from practical, everyday experience that, to grasp or be affected by them truly, one must be an expert in a particular and relevant field. The mystery has not vanished, but the mode of encounter has: what was once ambient has become mediated, what was once lived has become delegated.

Contemporary physics and mathematics, for example, are highly specialized—a result, no doubt, of the very processes of rationalization and intellectualization that Weber described. The processes of science continually press deeper into the unknown of a respective discipline's realm of concern—chemistry: elements and compositions; biology: life processes and genetics; physics: matter and energy. Science works on the frontier between knowledge and ignorance—the deeper science plunges, the more one must know and the farther from daily experience that knowledge becomes. These disciplines are now so well researched, and their focus lies on scales so remote from human experience that attempts to communicate them are hampered by the great difficulty of counter-intuitiveness and incomprehensibility, often falling flat. Yet, because of these same scientific processes, the explanations through maths and models, often associated with a relatively high degree of precision, the happenings in daily life have come to have explanations in physics, chemistry, and biology that also have a high degree of accuracy. The world with which humanity interacts, lives, and knows has become, and continues to be, increasingly calculable.

This is indeed amplified by the availability and widespread adoption of technology. As technology becomes increasingly connected to every facet of our lives, creating a smooth, seamless relationship among various technologies, we enter that sought-after, marketed technological "ecosystem." As a result, humanity becomes proportionally further removed from the spiritual, inner aspects of life. In this view, the disenchantment process is baked into technological advancement. In fact, since the 1960s, this view has been written on. Gabriel H. Marcel (1889-1973), a French philosopher, wrote on "despiritualization", which I claim is synonymous with disenchantment, stating that "the more man becomes dependent on gadgets whose smooth functioning assures him a tolerable life at the material level, the more estranged he becomes from an awareness of his inner reality" (1962:75). This speaks to exactly what Weber was lecturing some 50 years prior.

Here, it is worth briefly highlighting the epistemic differences among the sciences, social sciences, and humanities. While this has been a source of contention in public discourse lately, especially in the wake of the COVID-19 pandemic, there is an undeniable gap between the knowledge claims and their apparent legitimacy from the public's perspective. This will also vary from discipline to discipline. For example, while there is little resistance to the idea of gravity, to astronomical observations from TESS (the Transiting Exoplanet Survey Satellite), or to concepts of quantum mechanics, there are considerable contentions in public discourse surrounding evolution, genetics, and their connections to modification. While there may be little controversy over the historical claims of World War II, there are contentions about the founding year of the United States of America. While there is little issue with the claims of anthropologists studying tribes in the Amazon rainforest, there is an issue with the claims of sociologists that economic and political climates are disproportionately harming visible minorities or persons of colour.

Epistemology is a vast and rich field, and I am unable to devote the time necessary to unpack the intricate relationships among knowledge, power, legitimacy, and politics. But I want to highlight these contentions because they further corroborate the point at hand. So much knowledge has accumulated and been made accessible at any given moment, and all of it is ontologically situated in vast webs of complex arrangements. Knowledge itself, even if well established, has become increasingly subject to question. The phrases "that is your opinion" or "this is my truth" reveal the complexity of how knowledge becomes simultaneously individualized and relative. Ignoring its consequences, it demonstrates a new problem of modernity: the problematization of knowledge.

This form of disenchantment, in which rationalization, calculation, and the unending stream of information have enabled novel, individualized, and sometimes incorrect

formulations of knowledge, has, Weber argues, contributed to a loss of meaning. Weber tells his audience:

> Abraham or any other peasant in olden times died "old and fulfilled by life" because he was part of an organic life cycle, because in the evening of his days his life had given him whatever it had to offer and because there were no riddles that he still wanted to solve. Hence he could have "enough" of life. A civilized man, however, who is inserted into a never-ending process by which civilization is enriched with ideas, knowledge, and problems may become "tired of life," but not fulfilled by it (Weber 2004: 13).

The progress of knowledge, according to Weber, entraps civilized man in a never-achieved hope for the future. We can glean this by briefly looking at the state of the climate crisis. All major governments that have signed on to the United Nations Climate Change Conference (COP) agreements have pledged targets for 2030-2050 for specific policies, such as EV vehicles, to be implemented. Action today is not possible, but action tomorrow is. Civilized man is caught between knowing the problems and being unable to act on them. Furthermore, civilized man is confused about which approach to the problem is correct, or if there even is a problem to begin with! The rise of social media and streaming platforms adds to the avalanche of information that may aid or hinder.

It is not the place to unpack the role of social media and streaming platforms in the proliferation of misinformation, disinformation, and the tidal wave of informational noise that burdens modern society; that would take an entirely separate dissertation. The impacts—both documented and debated—have been discussed at length by think tanks and academics, and new research is being actively published in this area (Lorenz-Spreen et al., 2023; Budak et al., 2024; Broda & Strömbäck, 2024; Clemons et al., 2025; Kozyreva et al., 2024; World Economic Forum, 2025). But the economic forces that support and push these platforms forward do so with a full view of the consequences for knowledge and expertise. What Weber described as the "never-ending process by which civilization is enriched with ideas,

knowledge, and problems" touches on this, and I suggest surfaces the concept of progress (Weber 2004: 13). Before the notion of progress took hold in Western culture from the 18th to the 20th centuries, information on wider societal problems and world affairs lay outside everyday experience and concern. One lived within the surrounding environment, unaware of the difficulties of some faraway government or the material wealth of some faraway monarch. This is why Abraham died "old and satiated with life"—he lived only within and with what he could tangibly connect with.

But the civilized man cannot ever achieve all there is to achieve, nor can he experience all there is to experience, nor know all there is to know. Unlike Abraham, the civilized man is aware of all the possibilities: he is born, lives, and dies in a world that overflows with possibilities that he will never hope to achieve, even in small part. Weber pushes on this further:

> For he can seize hold of only the minutest portion of the new ideas that the life of the mind continually produces, and what remains in his grasp is always merely provisional, never definitive. For this reason death is a meaningless event for him. And because death is meaningless, so, too, is civilized life, since its senseless "progressivity" condemns death to meaninglessness (Weber 2004: 13).

This meaninglessness has recently become an area of great interest. The rise of public intellectuals like Jordan Peterson and Slavoj Žižek, for example, suggests a growing sense of meaninglessness, as these two former academics grapple with the very question of meaning. This tendency is also evident in the "traditionalist Catholic" or "Orthodox convert" movements (colloquially "trad cath" and "ortho-bro"), in which younger adherents—disproportionately male—are drawn to theologically conservative expressions that emphasize liturgical aesthetics and traditional values. There are also authors with books, like that from Harvard University psychology professor Steven Pinker, called *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress* (2018), and writer Jamie Wheal's

Recapture the Rapture: Rethinking God, Sex and Death in a World That's Lost its Mind (2021) who provide a glimpse of the desperation for finding meaning in a seemingly meaningless world. What Weber lectured on in 1917 seems to be at the heart of the contemporary zeitgeist.

Taylor's writing on disenchantment, like Weber's, emphasizes the fundamental shift in people's sensibility and perception. But where Weber frames this as a process of loss, Taylor treats it as a transformation: the recession of magical elements from daily life did not strip people of their connection with the higher-ness of Taylor's framework so much as it reconfigured that connection, making transcendence a matter of conscious orientation rather than ambient experience. Disenchantment "involves a change in sensibility; one is open to different things, yet one has lost one important way in which people used to experience the world" (Taylor 2011: 54). A consequence of this loss is a romanticized ideal, where a "thick emotional boundary between us and the Cosmos was now lived as a loss" (Taylor 2011: 57). Taylor calls this the "great disembedding" (2007: 148), which refers to the historical processes that occurred in Christian practice and theology that directly influenced the social and collective life changes towards greater individualism and material understandings (Taylor 2011: 63). It is this process, this great disembedding of secularization, that created a void filled with patriotism in the state. What is fascinating is that the primary cause of disenchantment was not science's continuing growth of importance and its rational and intellectual power, but the conflicts of the Church, like the Thirty Years War, and the very foundation of Christian theology, such as a personal relationship with the deity, and its move into the private.

In contrast, the enchanted world was inhabited by humans who lived before rationalization and intellectualization took hold of the cultural milieu. This was a time bound by 'magical' elements. By "magical," Taylor, drawing from Weber, means those practices

that assumed the reality of, and drew from, "intracosmic" origins, i.e., the supernatural. The enchanted world was "one in which spirits and forces [were] defined by their meanings" (Taylor 2011: 53), as reflected in historical records that attribute particular deities to certain natural elements, such as the sun, water, and fertility. These forces directly impacted daily life, shaping both the physical and psychological self. The consequences of this shaping were that, not only were enchanted peoples personally invested in such practices, but, as a whole society, the practices were directed at pleasing and worshiping the gods. This is evident in the large-scale monumental architecture of the ancient world, such as the great ziggurats of ancient Mesopotamia, the pyramids of ancient Egypt, and the great temples of ancient Greece dedicated to Athena or Poseidon. Taylor argues that the buffered self is not a reaction to disenchantment but is constitutive of it: as the background framework shifts, as the Cosmos ceases to be charged with meaning and spiritual force, the self simultaneously transforms, becoming "buffered", that is, bounded and insulated from a world no longer experienced as inherently meaningful (Taylor 2007: 27; Taylor 2011: 54). Within this buffered condition, the world of spiritual possibility recedes, and value is increasingly located in the ideals of material progress. We become numb to the world of possibility, living buffered from what could potentially be, and see value in the ideals of material progress.

And while we, as a society, have moved past many of the contentions since World War I, progress continues to play a significant role in epistemological discourse, as it has for centuries. For example, the dialogue around natural selection after the release of *On the Origin of Species* in 1859 was closely tied to the concept of progress. Much of the discussion assumed progress from lesser to greater species, similar, it was said at the time, to how western culture had developed over two thousand years. The worldview, so dominant at the time of *Origin*'s release, was that the crucible of high society, that progress in science,

technology and a refined, superior culture, went hand-in-hand (Spencer 1857; Lorimer 1997: 216-217; Cantor 2012).

Progress, however, in both examples above, assumes directionality. Progress, for those living in the nineteenth and twentieth centuries, was society evolving towards technological, scientific, economic, and industrial prowess. While Darwin may have presented natural selection in a way that did not conform to 19th-century theological ideals, it was nonetheless rooted in teleological language, an attempt to naturalize teleology (Lennox 2013: 154-156). Others took this to mean that 'lesser' cultures were simply not as advanced or capable of being so as, for example, Britain. Progress in common parlance assumes a direction and implies an end-state, but that end-state cannot be, and never will be, known. Humanity, like all matter, is bound by the thermodynamic "Arrow of Time", occupying only a single "frame" of space-time at any given moment, moving through frames as time continues in the only "directional" capacity that we know of. I am unable to "see" what will happen in, say, ten "frames" from now because, as a human, I cannot perceive time as a physical and manipulable dimension. The civilized man, therefore, becomes "tired of life" because he is perpetually in a state influenced by information overload and the prospect of a better world being "not yet".

Since, according to Weber, the rationalization and intellectualization of society is stripping the meaning out of life and causing it to be tiring and meaningless, where can the blame be directed? The enterprise that prizes rational and intellectual prowess almost exclusively is often blamed for the fatigued, empty lives people lead. Science, then, is not only under attack due to the collapse of expertise, but is also a target for attacks for contributing nothing but contradictions to traditional sources of societal meaning. As Weber, quoting Tolstoy, writes, "Science is meaningless because it gives no answer to our question,

the only question important for us: 'What shall we do and how shall we live?'" (Weber 2004: 17).

These questions are complicated and highly subjective, tied to the specific culture in which they arise. However, as I am focusing on the North Atlantic world, such questions have long been under the jurisdiction of Christendom. Ian G. Barbour, in his 1966 book, *Issues in Science and Religion*, and later refined in *Religion in an Age of Science* (1990) and *Religion and Science: Historical and Contemporary Issues* (1997), articulated his four typologies (conflict, independence, dialogue, integration) from which he claimed that science and religion answer very different questions—science answers the material, 'out there', 'how' questions, and religion answers the immaterial, 'inside', 'why' questions (Barbour 1997). This position has been held, in some shape or form, over the centuries, from the German Romantics to T. H. Huxley's agnosticism (Lightman 2002: 15-16). It has subsequently been taken up by contemporary philosophers (Swinburne 2004), historians (Brooke and Numbers 2011), social scientists (Gingras 2017), and theologians (van Huyssteen 2006; Haught 2017). But notice that this dualism precisely reflects the secular shift detailed above. We seem tipped in favour of the rational and intellectual.

Science, seemingly cold and calculated, appears to explain nothing personal, nothing that sets humanity apart from the rest of the world. In fact, every time science discovers something new, humanity is further removed from its self-perceived special status. Further, science appears to claim nothing about how one should live life to extract the 'fullness' of what life may offer. Weber's use of Tolstoy speaks to this clearly, and this everyday discourse continues to divide science and religion in the popular mind. Religion, commonly told and practiced, provides the meaning in life that Tolstoy sought. Much of Christian theology throughout the centuries offers insight and rationale for how to live one's life in the Grace of God and gain admittance to the Kingdom of Heaven, as seen, for example, in the

foundational works of Luther and Aquinas. Though Christian theology has fluctuated over those many centuries, commonly understood notions of salvation include being faithful to God, treating others as your neighbour, and not being seduced by greed and lust, to name a few. These all suggest *how* one should live and *what* one should do in the world.

The relationship between Weber's lecture and contemporary examples of science and religion intersecting raises many questions. A few choice ones are: Does life actually have meaning, or is it meaningless? Can science reveal what to do or how to live? In the North American context, these questions are often presented in popular culture across a range of media, and the responses, while varied, share a common root in the condition Weber diagnosed. Some works confront nihilism directly, dramatizing the encounter with meaninglessness without resolution: films like *Fight Club* (1999) and television series like *Rick and Morty* (2013–) present worlds in which meaning has collapsed and no redemptive framework remains, while Nirvana's "Smells Like Teen Spirit" (1991) channels that same collapse as raw, inarticulate affect—a generation's frustration rendered as noise and energy rather than argument. Others adopt an absurdist posture, acknowledging meaninglessness while persisting in spite of it—*Seinfeld* (1989–1998), *The Hitchhiker's Guide to the Galaxy* (1979), *Groundhog Day* (1993), and Camus' *The Stranger* (1942) each treat the absence of meaning not as tragedy but as a condition to be inhabited, often with irony or dark comedy. Still others express a more diffuse sense of cosmic alienation—the feeling of insignificance or artificiality within modern structures of meaning. *The Truman Show* (1998), *Being John Malkovich* (1999), and *Inside Llewyn Davis* (2013) each stage characters trapped within systems that produce the appearance of meaning while offering none, while songs like "Space Oddity" (1969), "Rocket Man" (1972), "Comfortably Numb" (1979), and R.E.M.'s "It's the End of the World as We Know It (And I Feel Fine)" (1987) evoke isolation and

disconnection from any orienting framework—the latter with a manic ironic detachment that treats civilizational collapse as background noise that is meaningless.

What unites these otherwise distinct cultural expressions is the underlying crisis Weber identified: "death is a meaningless event...And because death is meaningless, so, too, is civilized life, since its senseless 'progressivity' condemns death to meaninglessness" (Weber 2004: 13). Yet to read these texts only as confirmations of settled meaninglessness would be to collapse Taylor's framework back into Weber's. For Taylor, the immanent frame is not synonymous with disenchantment; it is the background structure within which both belief and unbelief, enchantment and disenchantment, remain live options. The very persistence of these cultural texts—their compulsive return to questions of meaning, alienation, and transcendence—is itself evidence of what Taylor calls the "cross-pressures" of the secular age (2007: 595). *Fight Club*'s violence reaches for an intensity that breaks through numbness; the absurdist persistence of *Seinfeld* or *Groundhog Day* inhabits meaninglessness in ways that resist despair; the cosmic alienation of "Space Oddity" or "Rocket Man" expresses not the absence of longing for connection but its painful endurance. These are not simply symptoms of disenchantment but sites where the pull of transcendence—displaced, sublimated, often unrecognized as such—continues to exert pressure within the immanent frame.

All of these texts are expressions of the same underlying root condition—disenchantment—and all of them are productions of creators from the North Atlantic world. It is no coincidence that the culture of the North Atlantic world, a hotbed of historical and cultural change heavily influenced by Christianity and science, produced these texts. Charles Taylor has spent much of his career concerned with and writing on disenchantment as a phenomenon of the North Atlantic world. In this vein, Taylor claims that a striking feature of its march towards secularity has been a "drive toward a personal religion" (Taylor 2011: 53).

This drive has been influential on the foundational aspects of modern North American life. For example, the very laws of both Canada and the United States are predicated upon a "universal" recognition of the rights and liberties of selfhood. That the practice of suing is so common, especially in the United States, is representative of the idea of self being that which is connected to the secular higher-ness discussed above. However, this drive towards individualization and the privatization of religion has done more than create a legal system of inherent selfishness; Taylor claims that this movement, "powerfully contributed to the disenchantment of the world of spirits and higher forces" (Calhoun et al. 2011:38).

Casanova, Taylor, and Weber's work on the secular and disenchantment has informed or been part of a new wave of scholarship labelled "the post-secular turn." Comprised chiefly of sociologists, philosophers and literary critics, these scholars have spoken of a post-secular turn as an analytical shift in the study of secularism and religion that treats secularism itself as a historical, contested formation and asks how religion, spirituality and "non-religion" shape modernity. The German philosopher Jürgen Habermas (1929-) first advances the notion of a "post-secular consciousness" in his 14 October 2001 peace-prize address "Faith and Knowledge" (*Glauben und Wissen*), delivered one month after 9/11. There, he argued that modernity's self-understanding must contend with the enduring semantic power of religious traditions, and he frames the clash between secular reason and faith as a learning process in which each side acquires reflexive awareness of its own limits. Post-secularism is then given a more complete treatment and systematic detailing in "Notes on a Post-Secular Society" in a 2007 lecture at the Nexus Institute of the University of Tilburg, Netherlands, and later published in 2008 under the same title. Habermas restricts the term to affluent Western democracies that have become conscious of living in secularized conditions, even though empirical religiosity persists and, in some cases, has grown. He abandons linear secularization theory and instead treats "the growth of a plurality of cultures and religious

world views" (Habermas 2008 para. 15) as a post-secular force that liberal states use to mediate conflicts without erecting a hard wall of separation between cultures, institutions, and peoples. This was demonstrated, claims Habermas, by drawings of Mohammed being debated as the wrongdoing of the cartoonist rather than Muslims enraged to murder by Islamic perlocution (Habermas 2008 para. 16). The conclusion for Habermas is a hope for a "complementary learning processes" between religious and secular citizens, embedded in deliberative democratic institutions that can move past conflict and distrust and work on bridging mutual spaces of agreeance (Habermas 2008 para. 37).

The normative mechanics of that learning process are detailed by Habermas in "Religion in the Public Sphere" (2006). Here Habermas introduces the "institutional translation proviso": religious actors may employ theological reasons in the informal public sphere, but once proposals cross the threshold into parliaments, courts, or ministries they must be translated into generally accessible language; secular citizens, for their part, carry a reciprocal duty to engage seriously with those translations rather than dismiss them. The reciprocity is real but also partial: the obligation to translate falls on religious reasons specifically, since secular language already counts as generally accessible. The cognitive burden is therefore redistributed rather than removed—an asymmetry that connects directly to Taylor's mapping of the religious and the secular, and the relegation of the religious from public to private. But here, this two-level model Habermas proposes preserves democratic equality and state neutrality while acknowledging religion's motivational resources. Habermas recognized the importance of the inner life and the 'why' questions, and sought to preserve them in public discourse. This is extended explicitly in *An Awareness of What is Missing: Faith and Reason in a Post-secular Age* (2010), where Habermas deepens the argument, contending that post-metaphysical reason itself depends on residues of religious meaning that cannot be generated endogenously, and urging an open dialogue in which

secular reason confronts “what it is missing.” Together, these texts locate post-secularism not in the re-sacralization of politics but in the mutual institutionalization of translation and learning across the secular–religious divide.

In sociology, the British scholar Gregor McLennan’s (1952) much-cited 2010 essay, “The Postsecular Turn,” gave the term greater currency in social theory. Reference works now routinely list “post-secular turn” alongside the linguistic, material and affective turns of recent decades. McLennan situates post-secularism not as a discrete paradigm but as a “Postsecular Spectrum” where “concerns and possibilities” are raised within different contexts, whether that be community, culture, religion, etc (2010: 4). The social sciences have approached this post-secular turn as a re-negotiation of the epistemological and political relationship after the failure of classical secularization narratives (Mahmood 2016; Bruce 2017). McLennan directs sociological inquiry toward the secular, troubled by the then-recent global trends antithetical to the secular thesis as conceived in the 1960s, toward concrete questions such as how different secular formations mediate power and how reflexive social science can register non-reductive religious experience. This framing allows for inquiry without surrendering explanatory rigour to theological epistemes. McLennan’s significance here is in clarifying the conceptual stakes of scholarship engaged in “anti-secular rhetoric” (McLennan 2010: 18), by conducting an audit of scholarship on secularism, pluralism, and democratic theory, concluding that postsecularism is ultimately “intra-secular rather than anti-secular” (McLennan 2010: 18-19).

Before turning to the scholars who have argued for re-enchantment, it is necessary to clarify what I mean by enchantment, and to distinguish it from two related but distinct terms—mystery and meaning—that have operated throughout this chapter and will continue to do so in the content analysis that follows. These terms are often used interchangeably in popular and even scholarly discourse, but they refer to different dimensions of the human

relationship to the world, and conflating them obscures the specific work that the Grand Cosmic Narrative performs. By *mystery*, I refer to an epistemic condition: what exceeds calculation, what remains unknown or unknowable within any given framework of understanding. Mystery, as I have argued above, has not disappeared in the secular age but has fundamentally changed in character. Where mystery was once ambient, like the forest's being simply mysterious, requiring no expertise to experience it as such, it has become mediated and delegated, absorbed into specialized domains investigated by experts working at scales remote from daily life. Yet mystery is also continually regenerated by science itself: each answer opens onto further questions, and the frontier between knowledge and ignorance advances without closing. Mystery, then, is the epistemic ground on which enchantment may, but need not, take root.

Enchantment I understand as an affective orientation: the felt sense that the world exceeds mere calculation, that reality is charged with significance, that one stands in relation to something greater than the self. This affective orientation, however, operates in at least three distinct registers that should not be collapsed into one. The first is what I call *enchantment of the unknown*: the experience of a world imbued with forces and meanings beyond human comprehension, characteristic of what Taylor describes as the porous self—open, vulnerable, and embedded in a Cosmos alive with spiritual agency. The stars as campfires lit by powerful beings, comets as portents of doom, the forest as a dwelling place of spirits, these are expressions of enchantment rooted in what lies beyond understanding. The second register is *enchantment of the revealed,* in which scientific knowledge itself becomes a source of awe. This is not enchantment despite knowledge but enchantment *through* it: the overview effect experienced by astronauts viewing the Earth from space, the staggering compression of the Cosmic Calendar, the recognition that stellar nucleosynthesis produced the very atoms of our bodies. Here, it is not the unknown that enchants but the

known, the sublime disclosed by science at scales that overwhelm ordinary comprehension. The third and final register is *enchantment of the narrative*: the investment of secular history with the affective weight ordinarily reserved for sacred story. When Sagan frames Samos as a pilgrimage site for the origins of scientific thinking, or when *Cosmos* presents Newton as a figure resembling a patron saint of the scientific endeavour, what is at work is a narrative sacralization, a deliberate framing that invites the viewer to experience the history of science as a story charged with transcendent significance. Having introduced these three registers earlier in the chapter, let us now turn to their combined effect. These three registers, taken together, specify the mechanism through which the Grand Cosmic Narrative produces what Chapter One identified as its constitutive genre feature: a durable existential orientation generated through affect-rich narrative. The orientation-producing function of the GCN is not a single, undifferentiated affective experience but the convergence of these distinct registers, each contributing its own phenomenological mode to the construction of meaning. It is this convergence that produces what I called, in Chapter Two, the GCN's 'secular-transcendent quality': not a transcendence beyond the material world, but a transcendence disclosed within it; that is, affect-rich, naturalistically grounded, and existentially binding.

Finally, by "*meaning*" I mean an existential orientation, as the sense that one's life has purpose, direction, and connection to something larger than oneself. This is the domain of Tolstoy's question as invoked by Weber—"What shall we do and how shall we live?"—and it is what Taylor's account of the conditions of belief most directly addresses. Meaning is not reducible to enchantment, though it may be sustained by it; one can experience enchantment, such as a momentary encounter with the sublime or a flash of cosmic wonder, without it translating into the durable existential orientation that constitutes meaning. The Grand Cosmic Narrative, as I argue, attempts to bridge this gap: it mobilizes all three registers of enchantment in the service of constructing a secular framework for meaning, a narrative that

offers purpose, belonging, and ethical orientation grounded in the story of the Cosmos rather than in the promises of revelation.

These distinctions matter because the disenchantment debate, as I have outlined it, operates at different levels depending on which dimension is at stake. Weber's disenchantment thesis is primarily concerned with mystery and the calculability of the world, thereby draining it of its unknowns. Taylor's account of the buffered self is primarily concerned with enchantment, the transformation of the affective orientation through which the world is experienced. And the existential crisis that both diagnose—the "tired of life" condition, the loss of fullness—is a crisis of meaning. The Grand Cosmic Narrative engages all three, and understanding its operations requires keeping them analytically distinct even as the narrative itself weaves them together.

Continuing on to the scholars who have argued for re-enchantment, they argue that re-enchantment is taking place all over in small instances if you look closely at smaller communities or change the scope of your analysis. I think it is critical to give these contrarians some time, for, as I said in the introduction to this chapter, my position is somewhere in the middle: secularization has seemingly disenchanted the North Atlantic world, but narratives of science seek to re-enchant it. I agree that disenchantment is a cultural phenomenon experienced subjectively by many who lack meaning and orientation to the "higherness" Taylor outlined, and that the technological and rational field we occupy is increasingly straining a sense of connection, mystery, and intrigue. But it is not hopeless. Enchantment, I would argue, has not retreated into isolated pockets but persists more widely than we tend to recognize; the epistemic conditions of secularity have dulled our capacity to see it and name it as such.

As I will show in a moment, this is precisely what makes the Grand Cosmic Narrative so significant—it attempts to re-enchant en masse, even if the structural conditions identified

by Taylor suggest that such mass re-enchantment faces profound obstacles. The word "attempts" is important here as I am claiming significance for the GCN not because it has demonstrably succeeded in displacing the conflict thesis or reversing the logic of disenchantment, but because the scale of its attempt, and the cultural appetite it has revealed, tells us something important about the contemporary hunger for narratives that transcend the sterile binaries of the conflict framework and traditional religious grand narratives in the North Atlantic world. This framing will help build towards my project's goal of revealing a Grand Cosmic Narrative that attempts to re-enchant *en masse*.

One such scholar, Jason Josephson-Storm, a professor of religion at Williams College, has argued against disenchantment, positing that it is a myth created in response to the revival of occult and spiritualist movements in the 18th and 19th centuries, periods of great transition. Josephson-Storm argues that it was in fact the very formulation of such alternative practices that allowed for the articulation of the myth of disenchantment, writing "the more 'magic' becomes marked as antimodern, the more it becomes potentially attractive as a site from which to criticize 'modernity'" (Josephson-Storm 2017: 16). Interestingly, Josephson-Storm argues that what gave rise to the contention of the occult, the magical, the otherworldly, and the primacy of the rational and the secular is the opposition of science and religion. As Josephson-Storm writes, "*one* of the mechanisms that both makes magic appealing and motivates its suppression is the reification of a putative binary opposition between religion and science, and the production of a 'third term' (*superstition*, *magic*, and so on) that signifies repeated attempts to stage or prevent reconciliation between these opposed discursive terrains" (2017: 13).

This interesting claim identifies a unique aspect of disenchantment—it is a self-reinforcing dynamic. What Taylor helps us to see is that disenchantment, once established, generates the conditions for its own perpetuation. As science and religion are perceived as

competing for ontological and epistemic superiority, this perception simultaneously opens up space for critiques of their claims to superiority. I should clarify that I am not claiming science and religion *are in conflict,* but there is no doubt that some overlap and conflict arise. After all, it is not that complexity means there is no conflict; only that conflict is one option among a complex array of engagements between science and religion. Since science and religion occasionally conflict, often over claims about nature that involve the human or what would impinge on God's full potential in the world, this opens up space for a sense of disenchantment. Magical, supernatural, occult practices are in reaction to the power structures that seemingly control the narrative of what is correct, what is truth. It becomes a place where the like-minded gather to critique the world as they see it—disenchanted.

And while some, like Josephson-Storm, have used the occult as a means of justifying the "myth of the mythless society" (2017: 7), others have used the interpretation of science as the foundation for an enchanted world. One example is George Levine's work, *Darwin Loves You: Natural Selection and the Re-Enchantment of the World* (2006). Levine, professor emeritus of English at Rutgers University, argues that disenchantment does not follow from natural explanation, and that by re-examining natural selection through greater scrutiny of the work and life of Darwin we arrive at a set of cultural, ethical, and spiritual values that are ripe with meaning, hope, and purpose—what is referred to as "nontheistic enchantment" (2006: 22). What we need, Levine contends, is a "value-laden secularism" (2006: 23) by changing the context of what the natural world means to include the complexities of Darwin's revelation of natural selection, a nontheistic secular enchantment situates the human into the world in relation with all life and thereby creates an "attachment to the world [which] provides an invaluable source for participation in the politics of social justice" (2006: 25).

In other words, Levine is saying that valuing life and all its varieties of expression may not only give the world definition but also meaning. By viewing life as being of a quality

akin to divine origin, but from a secular perspective, we come into relation with all the flora and fauna of our world that would create the "attachment" he wrote of. In being attached, he reckons that our pursuit of environmental and social justice would be more fulfilling and more successful, as our orientation would expand to encompass a planetary, whole-world ethic—a grander scale of compassion. This is a step toward the Grand Cosmic Narrative, as the GCN opens the boundaries of compassion to encompass all those "forms most beautiful and most wonderful" (Darwin [1859] 2009: 427) and beyond, into the more abstract relationality of humanity and the stars.

But how can we think of distant stars as something related to us? Stellar nucleosynthesis models indicate that the intense pressures generated by the fusion of hydrogen and helium into heavier elements account for the diversity of chemical elements that comprise all life. But atoms and stars don't mean much as they are objects, unrelated to us. Some conceive of subjects belonging to the realm of society and objects to the realm of nature (Han 2015). But for the late French anthropologist and science studies scholar Bruno Latour (1947-2022), modernity is defined by the purification of subjects and objects into distinct ontological domains: subjects belonging to society, objects to nature—even as this very separation proliferates hybrids that blur the boundary between them (Latour 1993). Latour helped develop an entire framework called Actor-Network Theory (ANT), which removes agential boundaries between subjects and objects, treating them as equal actors and things (2005). In ANT, objects have just as much agency as a subject, thereby demonstrating the way that a smartphone, for example, has agency, and thus power, over the user and vice-versa, creating a network of interdependent relations between the subjects and objects which form a network, such as the device creator, supplier, cellular network, app developers, user, etc.

By thinking this way and conceptualizing subjects and objects as having equal agency and power, disenchantment is expelled from modernity, according to Latour (1993), because the West has never actually been modern. I hold that this is a valuable framework for thinking about enchantment through the lens of science. There has never been a divide between society and nature; only a falsely assumed one, as most objects are "hybrids" of nature and culture, because everything and everyone are relationally interdependent (1993). Latour writes, "the adjective modern does not describe an increased distance between society and technology or their alienation, but a deepened intimacy, a more intricate mesh, between the two" (1999:196). In Latour's conception, technology's dependence on science does not disenchant, as humans are intertwined within the network of science, technology, culture, and nature.

This poses an interesting challenge for us. Weber and others have argued that the world is disenchanted, that rationalization has stripped nature of its mystery and alienated us from existential meaning (Weber 2004). But both Taylor and Latour, in different registers, push back against this narrative. Latour argues ontologically that we have never actually achieved the separation from nature that modernity claims for itself. Taylor, meanwhile, argues phenomenologically that the secular age has not produced the flattening of spiritual life that the disenchantment thesis predicts; rather, his "nova effect" describes an explosion of new forms of religiosity and meaning-seeking within the immanent frame (2007: 299–300). Taylor is explicit on this point: he refutes the claim that "science refutes and hence crowds out religious belief" (2007: 4). What unites these two thinkers is a shared suspicion that the disenchantment story is itself a construction—what Taylor calls a "subtraction story"—rather than a straightforward description of what modernity has done to us. I have spent most of this chapter arguing that something *is* amiss in the metaphysical sense, that there is a felt alienation that tugs at the existential spirit of our society. But the corrective offered by Taylor

and Latour together is essential: we occupy a world where mystery persists, where the plants and animals are related to us, part of us, if we remove ourselves from our screens to look. The re-enchantment of the world may come not from reversing disenchantment but from recognizing that it was never as complete as we were told—from an opening up, a widening of what we consider kin, meaningful, and fulfilling.

Many writers who engage with themes of re-enchantment, derived from science, aim to provide purpose in our culture and communities that extends beyond the local and into the global and beyond. Others, taking a position of never-lost enchantment, seek not to restore meaning so much as to reveal the networks of attachment and agency that the modern settlement obscured. Carl Sagan was one of these writers, having written seven books for the general reader during his lifetime, with two more released posthumously; in addition, he wrote over 600 articles and 11 other books (Frank 2012). Sagan's popular works were anchored by cultivating a "cosmic perspective," as his first book detailed. In that book, Sagan imagined what an advanced, alien intelligence would think of Earth and its inhabitants, an exercise he repeats in the *Cosmos* series. This exercise helps to inform how we are "connected up with the universe" (Sagan 2000: 187) by defining an abstract astrophysical scale and stellar-formed chemical composition into ethical provocations meant to quench "the deep human need to seek and understand our connection with the universe" (191). It is in *Cosmos*, shown throughout this project, where he brings these ethical reflections to bear with quotidian human conflicts juxtaposed with the 13-billion-year chronology of the universe, as laid out in the Cosmic Calendar in his Pulitzer-winning meditation on the evolution of cognition, *The Dragons of Eden: Speculations on the Evolution of Human Intelligence* (1977). This book also formulates a creation story, something repeated for *Cosmos*, but on the scale of the human brain, speculating from cosmic hydrogen to Shakespearean prose.

As I stated in Chapter One, the Cosmic Calendar is a staple of the series, being present in all three. In each of them, Earth is the starting point for us, for understanding our place and our connection to this vast and humbling Cosmos. For Sagan, the opening page of the companion book for *Cosmos* states his belief that "our future depends on how well we know this Cosmos in which we float like a mote of dust in the morning sky" (1981: 4). The Cosmic Calendar is a visual representation, an allegory of that belief, and it permeates all his works post-*Cosmos*, especially and crucially in his famous Pale Blue Dot passage, which I will save for the last chapter of this project, from the book of the same name, where the Voyager I image converts one-pixel fragility into a planetary solidarity imperative. If "every saint and sinner in the history of our species lived there—on a mote of dust suspended in a sunbeam", then stewardship and exploration become two faces of the same moral coin (Sagan 1994: 6). Scholars of science communication have shown that this gesture of scaling the reader abruptly from the personal to the cosmic, produces a distinct blend of humility, resolve, and exhilaration (Kirby 2017). The motivational force in Sagan's work arises not from triumphant human exceptionalism but from the recognition that our improbable existence obliges us to protect life and extend curiosity beyond Earth's littoral.

Throughout Sagan's works, he recasts science as an ongoing romantic endeavour, much like the German tradition, rather than a repository of certainties. For example, in the 1979 *Broca's Brain: Reflections on the Romance of Science*, Sagan's essay collection from his earlier writings that mused on ideas, some he would later review and update for *Cosmos*, he detours through 19th-century phrenology, radio astronomy, and exobiology to dramatize false starts and serendipitous insights, to emphasize a point central throughout his life, that "science is a way of thinking much more than it is a body of knowledge" (Sagan 1979: 15). Science, for Sagan, and therefore for the Grand Cosmic Narrative he and Druyan develop, is a framework, an orientation from which to approach and deal with the world. It asks each of

us "to *really* think of something: the shape of clouds…why the moon seems to follow us as we walk…or how far is up", anything, but to do so seriously, inquisitively (Sagan 1979: 16). This is central to his view, first publicized in *The Cosmic Connection*, where he engages seriously with speculative SETI scenarios that have been raised in the USA during his life, mining them for any possibility of reality, insisting that "there is nothing to prevent anyone from seeing signs of past extraterrestrial visitations all about" (Sagan 2000: 206), but "if we are truly interested in the quest for extraterrestrial intelligence" (Sagan 2000: 207), we must demand that "extraordinary claims require extraordinary evidence" (Sagan 1979: 63).

This stylistic fusion of inquisitiveness, empiricism, moral positioning, and worldview framing constitutes a direct rejoinder to Weber's thesis that rationalization "disenchants" the world (Weber 2004). This is evidenced throughout all the *Cosmos* series, and all of Sagan's popular works; this is even represented in the titles/subtitles of his works, like "a personal voyage" (1980), "the romance of science" (1979), "cosmic connection" ([1973] 2000), "a vision of the human future" (1994), and "science as a candle in the dark" (1996). Sagan's rhetorical work throughout his career reveals an author comfortable with replacing supernatural mystery with a secular equivalent, rooted in stellar nucleosynthesis, natural selection, and the thermodynamic arrow of time. The result is an enchanted materialism, a Grand Cosmic Narrative, in which empirical explanation amplifies, rather than extinguishes, the capacity for reverence: "Science is more intricate and subtle, reveals a much richer universe, and powerfully evokes our sense of wonder" (Sagan 1979: 76).

Sagan's rhetorical push for a view of science and the world as enchanted—imbued with meaning and ripe for discovery—reflected his and Druyan's ambition to offer the public a smarter, more meaningful science programme, one that drew on subjects Sagan was an expert in that had broad appeal, such as SETI. While an Assistant Professor at Harvard University, Sagan and two colleagues conducted preliminary research that would later inform

SETI practices, but this interest may have cost him tenure at Harvard (BBC 1967). However, his interest in SETI and space travel was shared by others in the 1960s, and such writers, worried about Cold War realities and the possibilities of the Space Race, gave rise to the idea of "Spaceship Earth" (Höhler 2015). While the notion of the Earth as a vessel traversing space had earlier antecedents, as Henry George described a "well-provisioned ship, this on which we sail through space" in *Progress and Poverty* (1879), and Buckminster Fuller claimed to have coined the phrase "Spaceship Earth" in the early 1950s, it was the convergence of nuclear anxiety and the Space Race that gave the metaphor its political urgency.[15] Its most consequential articulation came from Adlai Ewing Stevenson II, the US Ambassador to the United Nations, when in 1965 he told the Economic and Social Council in Geneva that,

> we travel together, passengers on a little space ship, dependent on its vulnerable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work, and, I will say, the love we give our fragile craft. We cannot maintain it half fortunate, half miserable, half confident, half despairing, half slave-to the ancient enemies of man- half free in a liberation of resources undreamed of until this day. No craft, no crew can travel safely with such vast contradictions. On their resolution depends the survival of us all (Environmental Cloud Atlas 2014).

We can clearly see the emphasis on the spaceship metaphor to promote safety, security, and peace. This has continued recently as well, with the prominence of UFO/UAP discourse in United States politics—exemplified by congressional hearings that deploy scientific and security terminology—appears particularly pronounced among right-leaning constituencies

[15] It should be noted that Husserl's characterization of the Earth as "the originary ark" (die Ur-Arche) in his c. 1934 manuscript on the phenomenological origin of spatiality is sometimes cited as a precursor. However, Husserl's project is fundamentally distinct: his "originary ark" designates the Earth as the unmoved transcendental ground of embodied spatial experience, not a fragile vehicle requiring collective stewardship. The "Spaceship Earth" metaphor operates in an entirely different register — environmental, political, and resource-oriented.

and may represent an expression of re-enchanting impulses similar to those observed in other contemporary movements. Despite its quasi-scientific framing, this fascination with aerial phenomena potentially functions as a secularized avenue for experiences of mystery, wonder, and the numinous within a technological idiom (Pasulka 2019).

This attitude arguably arose during the Cold War, a period characterized by technological, scientific, and geopolitical competition between the United States and the Soviet Union. As rockets were being developed to carry nuclear weapons across continents, they were simultaneously being built to show off the technical capacities of US or Soviet scientists and engineers to put human beings precisely and safely into space and, later, beyond. The Apollo programme is the most popular and important non(directly)-military project from this time.

In early 1967, the first Apollo mission (Apollo 1) was prepared for launch (Williams 1999), but it wasn't until Apollo 8 lifted off from Cape Canaveral at 7:51 a.m. EST on December 21, 1968, that a crewed mission reached beyond Earth's lower orbit. It took Apollo 8 three days to reach the Moon, but on December 24th, the now-famous "Earthrise" photograph and Genesis reading took place. The reading and photograph were a sensation. Appearing on televisions live and in, for example, the *New York Times* (Wilford 1968), *Chicago Tribune* (Farrar 1968), *The Sun* (Sehlstedt 1968), *The Washington Post* (Delong 1968), and as far away as Hong Kong's, *South China Morning Post* (1968), the world was captivated by the spectacle of human beings at the moon, and the view of Earth from the Moon.

The Apollo sustained mostly continued success. The most notable of these successes occurred on 20 July 1969, when the Apollo 11 astronauts—Neil Armstrong, Michael Collins, and Edwin "Buzz" Aldrin—landed the Eagle module on the lunar surface. Broadcasting live via module-mounted cameras, Armstrong became the first human being to touch down on the

moon's surface, reaffirming America's position of power and setting the course for the remainder of the space race. However, for reasons that cannot be discussed in detail here, the Apollo programme lost much of its cultural and political backing after Apollo 11 (Shayler 2002). As a result, the Apollo programme ended with Apollo 17, which launched on December 7, 1972, at 12:33 EST. During the twelve-day mission, another famous photograph was taken at 05:39 EST on launch day, after the astronauts caught a glimpse of Earth fully illuminated. The view they saw prompted them to begin taking unscheduled photographs (Orloff and Harland 2006, Wuebbles 2012). This photograph would become known as the "Blue Marble".

Both photographs are still widely used today, and most importantly for my purposes, are used in conjunction with environmental re-enchantment projects, such as Earth Day. The re-enchanting narrative of Spaceship Earth is a product of science, technology, and new perspectives previously unavailable, which became connected in networks of technological and political entanglements. I claim that these photographs are imbued with what I call *technosubjectivity*. This term encapsulates the human user's subjective experiences and feelings and places them within the artifact's own technological function. When the astronauts took photographs of Earth, their inner feelings—part of their subjectivity—were simultaneously captured in the awe and perspective of the moment. It is not only the objective, external world that is imprinted onto the film, but also the inner, subjective world.

The machines that brought us to the moon and enabled us to capture those photos are much like John Tresch's (2012) "romantic machines" in that they embody the Cold War rationales and motivations. Tresch argues that nineteenth-century French technologies were "romantic machines" in that the engineers and artisans who built the machines endowed them with the designers' inner, subjective emotions, given their social and temporal milieus. In so doing, "all parts of the Cosmos had to be brought together and represented in a single site, in

order to focus and organize human activity and remake the world" (2012: 6). The romantic machines had a technosubjectivity that aided in advancing the Romantic movement occurring in nineteenth-century France. Likewise, the experience of seeing our world from space and the powerful emotional effect it has had on virtually every astronaut who has viewed the Earth from space is one of the primary reasons why the images are so popular today. This is a condition that Frank White has termed the "*overview effect*" (White 1987).

I argue that the "overview effect" operates similarly to what Taylor (2007) calls a "transformation perspective." This transformation perspective, Taylor writes, takes human beings "beyond or outside of whatever is normally understood as human flourishing, even in a context of reasonable mutuality (that is, where we work for each other's flourishing)" (Taylor 2007: 430). What Taylor infers through the transformation perspective is a conscious shift in viewership of one's position as stuck between the subjective and objective worlds. The subjective world is the inner place of thought, feeling, and emotion. This invisible world is where those mental states often associated with the true power of religion reside. In contrast, the objective world is the material environment with which our physical bodies interact. The transformational perspective brings together the two worlds of subjectivity and objectivity.

Each of the photographs offers a transformational perspective, instilling in the viewer, on the one hand, a view beyond and outside commonly understood notions of human activity and flourishing, grounded in the materiality of the physical world and in visible-spectrum representations of what the Earth looks like. On the other hand, it shares a feeling of wonder and smallness, a revelation of the sublime that the astronauts no doubt felt. The view of the Earth, small and alone, surrounded by an ever-reaching darkness, strips bare the normal categorical notions of country, race, or separation by ideology or difference, and offers instead a fragile, blue ball that reflects togetherness and oneness. In other words, these

images provide a glimpse of human flourishing that is both grounded in the objective (present conditions of the Cold War and views of Earth, for example) and subjective (ideal hopes for a better world tomorrow and the sublime). These images re-enchant not through mystery—there is nothing seemingly unknown in a photograph of the Earth—but through revelation: they are instances of what I have called enchantment of the revealed, in which scientific and technological achievement discloses a reality so staggering in scale and implication that it overwhelms ordinary comprehension and produces an affective response akin to the transcendent. It is the *known* that enchants here, not the unknown, and this is precisely what distinguishes the re-enchanting work of science from the enchantment of the pre-modern world. This is used by environmentalists and science communicators to build a framework of ethical compassion for Spaceship Earth.

Cosmos

In this chapter's content analysis section, we will examine episodes that demonstrate how *Cosmos* tells a story that encompasses the history of science, emphasizing how pursuing questions about nature and reality reveals answers to long-held positions. *Cosmos* frames this story as a narrative that inspires viewers to discover the world, enrich their understanding, and ultimately see it as always enchanted by mystery and wonder, leaving room for future generations to seek the numinous. For this section, we will look at episode 7 of the first series, *A Personal Voyage* (APV), titled "The Backbone of Night," and episode 3 of *A Spacetime Odyssey* (ASO), titled "When Knowledge Conquered Fear."

These episodes each frame science as a tool for knowing the world in ways not possible with previous epistemological frameworks. They are, therefore, rooted in secular ideals as propagators of knowledge that can be empirically tested and collectively useful. For example, in APV, Sagan uses curiosity as the episode's narrative thread, explaining that when

historically stifled, it has set us back. Through curiosity about the natural world, secular positions flourished, and authority became less concentrated in the hands of the elite. In ASO, Halley's Comet is the episode's narrative core, revealing how humanity moved from treating comets as omens of doom to unlocking the potential to go beyond our planet, using science to make accurate predictions of future events. These episodes focus on different aspects of the history and philosophy of science. Yet both strive for the same conclusion: instilling a sense of hope, mystery, curiosity, and a new way to give meaning to the lingering questions of our fragile, temporary existence.

Cosmos: A Personal Voyage

The episode's opening is unique: instead of opening on vast vistas of space or exotic regions of Earth, we see highways leading into New York City, specifically the borough of Brooklyn, where Carl Sagan was born and raised. "The sky calls to us," Sagan says, as we see the Verrazano-Narrows Bridge and a white car heading into Brooklyn. "There was a time when the stars seemed an impenetrable mystery. Today, we have begun to understand them. In our personal lives also, we journey from ignorance to knowledge" (00:21), he continues as the white car makes its way off the 278 Interstate Highway and into Brooklyn. We can already glimpse the framing Sagan is going for: mystery surrounds us, and unpacking those mysteries is a pursuit that brings about the advancements we see and know. Sagan, standing in a playground, recalls his childhood curiosity about stars, saying that "even with an early bedtime, in the winter you could occasionally see the stars" (00:37). A theme throughout this episode is the power of curiosity and the responsibility to nurture it, leading to a lifelong pursuit of questioning and probing the world around us. "I would ask other kids and adults, and they would answer, 'they are lights in the sky, kid'" (00:49). Sagan, visually amused by this memory, exclaims, "There must be a deeper answer" (00:56)

Children and curiosity are central to this episode, and its thematic core is the inquisitiveness of the world around us, a theme Sagan pushes throughout the series. Children and squirrels in a park are shown before Sagan takes a seat on a bench and recalls his mission to find the answer to his question, which up to that point had yielded unsatisfying results. He recalls his trip to the library, asking the librarian for a book on stars, which returned a "funny kind of picture book with portraits of men and women with names like Veronica Lake and Alan Ladd" (01:23). These weren't the stars he meant. "For some reason, then obscure to me, she smiled and got me another book, the right kind of book" (01:35). For the young Sagan, the book revealed something "astonishing, a very big thought" (01:47): that the stars were suns far away, and our sun is a star, just very close. Sagan sets up this story to thematically establish the episode's thread, but in so doing, he encourages viewers to be comfortable questioning the world around them and to be skeptical of figures of authority (in this case, adults). Sagan's voiceover questions how anyone could know this fact and asks why there couldn't be planets around other stars.



Carl Sagan sits on a bench in the neighbourhood in NYC where he was born and raised, pointing in the direction of the first library he went to (APV Ep. 7 - 01:06).

Sagan appears in a school classroom, noting the importance of his parents' and a few teachers' disposition towards encouraging his curiosity as a child. The scene is happening in Sagan's actual sixth-grade classroom, "to remember what it was like" (04:09), as he hands out recently captured satellite imagery of Jupiter, Saturn, and their many moons from Voyager 1 and 2. "Every one of us begins life with an open mind, a driving curiosity, a sense of wonder" (05:06), Sagan says to the viewer before he begins taking questions from the class. The students happily took the recent photos from the twin satellites that Sagan helped develop, and Sagan laughed, clearly enjoying himself. Sagan spent much of the latter part of his life immensely worried about the future of American children. Almost the last quarter of *The Demon-Haunted World* (1996) was concerned with this very subject. Sagan said after

conversations with students, parents, and teachers at schools across the USA that students just "memorize 'facts'. By and large, though, the joy of discovery, the life behind those facts, has gone out of them. They've lost much of the wonder and gained very little skepticism. They're worried about asking 'dumb' questions; they're willing to accept inadequate answers; they don't pose follow-up questions; the room is awash with sidelong glances to judge, second-by-second, the approval of their peers" (Sagan 1996: 322). The music swells as close-up shots of the children listening attentively to Sagan are shown, and the scene transitions to Sagan walking along the pier at night.

Sagan's voiceover begins, "Sometimes I think how lucky we are to live in this time, the first moment in human history when we are, in fact, visiting other worlds and engaging in a deep reconnaissance of the Cosmos" (07:16). Sagan, of course, spent much of his life advocating for space exploration, having recently come off of directing the Voyager special programmes committee for the Golden Record, founding the Planetary Society, and being Director of Cornell's Center for Astrophysics and Planetary Science. Many of his books, discussed above, dealt with this topic, and his one work of fiction, *Contact* (1985), which was adapted into the 1997 movie of the same name, also addressed extraterrestrial intelligence. The two went hand in hand. The Karl G. Jansky Very Large Array (VLA), a radio-astronomy observatory in New Mexico, featured prominently in *Contact*, is the premier laboratory for the SETI Institute, where Sagan was a founding Trustee. Sagan long pushed to carve out space to view the world as enchanted through the pursuits of science and exploration; it is clear he would have taken serious issue with Weber's thesis.

Leaning against a pier's railing and putting away a bag of roasted chestnuts he purchased a moment ago, Sagan continues his imaginings, but this time of people "hundreds of thousands of years ago, soon after the discovery of fire" (08:16). He imagines their thoughts about the stars in relation to their newly discovered prowess over and use of fire. In

effect, what Sagan is doing is imagining a thought process that alludes to the methods of science Sagan wishes to instill in the viewer: to make connections, think critically, and probe deeply wherever thought may lead. The content of Sagan's imagined inner dialogue is, much like Taylor suggested, enchanted. The stars here are thought of as fire, glowing brightly in the night but far away, and "maybe the stars are campfires which other wanderers light at night…But why don't those wanderers fall from the sky…Those beings…must have great powers" (09:56).

I take that Taylor would have viewed the content of this imagined inner dialogue as characteristic of the porous self, someone open to the world of Nature and to the possibilities of a world imbued with mystery, where the stars might be campfires lit by powerful beings overhead. But what is analytically more interesting is that Sagan is the one doing the imagining. Sagan, a paradigmatically buffered modern subject operating firmly within the immanent frame, nonetheless narrates this enchanted worldview not as error or naïveté but with evident sympathy, even reverence. This is precisely the kind of cross-pressure Taylor identifies as constitutive of the secular age: the immanent frame does not eliminate the pull of transcendence or enchantment but rather repositions the modern subject's relationship to it. Sagan cannot inhabit the porous self he depicts, but he can, and does, appropriate its narrative posture, channelling a sense of cosmic wonder that borrows the affective register of enchantment while remaining anchored in secular epistemology.

What is operating here is a layering of the registers of enchantment distinguished above: the *content* of Sagan's imagining is enchantment of the unknown, the porous self's experience of a Cosmos alive with mysterious agency, but the *mode* of its delivery is enchantment of the narrative, in which Sagan invests secular history with the affective weight of sacred story. The viewer does not encounter the campfire stars as a porous self would; the viewer encounters Sagan's reverent narration of that encounter, and it is this narrative

framing that carries the enchanting force. Sagan, offering anthropological evidence for this, continues that “contemporary hunter-gatherer communities” are evidence of fantastic stories of the stars, such as the !Kung, who were of great anthropological interest in the 1970s, had only just been published in Patricia Draper’s (1971) field research, which stated that the Milky Way galaxy, as viewed at night, is “the backbone of night” (10:34).

Sagan argues, much like Taylor’s enchanted time, that thinking of spirits and mysterious forces, where no explanation was any more scrutable than another, eventually led to them coalescing into explanations shared across major cultures around the globe, being “replaced in most human communities by another idea...gods” (11:11). Sagan, spending most of his life in public view fighting against misplaced trust in the explanatory power of religion and pseudoscientific thinking, urges the audience to reflect on those “rituals and myths, some desperate and cruel, others imaginative and benign” (12:34). Not just critical of these ancient tales, Sagan admires the “works of surpassing beauty” (13:04) in honour and gratitude to them, like that of the Heraion of Samos in Greece shown on screen, which acted as a “bridge from their world to ours” (13:45). Sagan claims this moved us “once again in our voyage of self-discovery on our journey to the stars” (13:55).

The Complexity Principle appears here, as represented in Sagan’s thinking on the past. Sagan and Druyan created a narrative and framework that places humanity in an ever-changing lineage, emphasizing and respecting how those who came before shaped today. This is clearly articulated throughout this episode, as we will see, but it is also expressed in Sagan’s respect for the architecture of great “works of surpassing beauty”, a testament to the skill and “extraordinary eye for clarity and symmetry” (13:29). These extraordinary works, like the Heraion, coincide with the duality of time that Taylor discussed, where the drive towards secularity, driven by its self-created duality between the sacred and the profane, divided that duality to such a degree as to render them objects free from subjective and

transcendent meaning. Great works like the Heraion were sacred in their meaning and symbolism, but profane in the mathematics, engineering and *techne* needed to develop such stunning works. Now they are only technical achievements of a time long past.

Triumphant horns play, and Sagan appears on a sailboat off the coast of Samos. Here, Sagan says, "twenty-five centuries ago…there was a glorious awakening" (14:13) of inquiry into the natural world. Sagan briefly introduces some of the ideas of this time from the likes of Aristarchus, Thales, Anaximander, and Democritus, who asked questions and offered explanations that pre-dated our establishment of them by over two thousand years, such as the development of species, the sun revolving around the earth, and disease and medicine theory. It was a time when "one of the great ideas of the human species" developed, that "the universe was knowable. Why? Because it was ordered, because there are regularities in nature which permitted secrets to be uncovered" (15:01). The rules of nature, the order in it, was called "Cosmos…set in stark contradiction to…Chaos" (15:26). In the Greek mythos, this order gave rise to Gaia, Tartarus, and Eros. This, Sagan claims, was the first conflict between "science and mysticism, between nature and the gods" (15:37). It is worth noting that Sagan's language here deploys precisely the conflict framing that I have argued the GCN as a whole transcends. This is not a contradiction so much as an illustration of the GCN's internal complexity: the narrative contains conflict-adjacent elements even as its overarching structure resists reduction to the conflict thesis. The GCN is not uniformly post-conflict; rather, it is a narrative in which conflict episodes are embedded within a larger arc of narrative framing, integration, and cosmic belonging.

Here again, Complexity is at work, and it would be unfair to claim conflict is being presented in Sagan's claim. Recall that Complexity holds that a matrix of interactions may occur in the engagements with what we would call science and religion. Here, Sagan uses these terms for comprehensibility, a choice made to help the audience understand. It would

not have been possible to label science as science during the time of the Greek rise to power, nor could we call religion religion at any point before the 16th century, as Peter Harrison made very clear in his *Territories of Science and Religion* (2015: 11-15). But as I mentioned above, Sagan and Druyan are creating a genealogical thread, a Grand Cosmic Narrative, that spans the course of recorded history to examine how inquiries into nature and discussions of the world helped shape a "way of thinking" that the GCN takes to be a framework for a flourishing world. With this in mind, the context of Sagan's claims of conflict falls comfortably in the matrix of Complexity in that he is detailing a mythological transition from Chaos, the abstract being of Greek primordial time, to order via the original Titans: a tension between Cosmos (order and knowability) and Chaos (abstract and unknown).

Keeping hold of the thematic threads of questioning authority and the world around us, Sagan asks the viewer why such ideas developed in Ionia so long ago. He responds that the peoples of Ionia were free to inquire without the burden of established ways of thinking and the power of the old empires' enforcement. The scene transitions, and Greek *Demotiko* (traditional folk) plays as scenes of Greek men and women living their lives on the island of Samos are shown. At the same time, Sagan continues to discuss the importance of the diversity of ideas that flourished in Samos many centuries ago. He hops off the boat, and the music becomes more serious and contemplative: "Once you're open to questioning rituals and time-honoured practices, you find that one question leads to another" (17:16). Sagan frames this as the rational impulse of science, curiosity compounding upon itself. But the structure of the claim is worth noting: the world, for Sagan, is inexhaustible. Each answer opens onto further questions, and it is this very inexhaustibility that generates the sense of wonder on which his narration depends. What Sagan presents as scientific curiosity thus carries an affective register that closely resembles what it ostensibly replaces: a sense that the world exceeds our grasp, that mystery is not eliminated by inquiry but relocated within it.

Sitting at an outdoor cafe, Sagan sips a coffee, puts it down, and asks the audience what to make of the many different cultures' gods that control overlapping aspects of nature, like Marduk and Zeus. He says that one may claim that the other, the wrong god, was fabricated by that culture's priests. But, he posits, if that one could be fabricated, why not both? Sagan returns to the claim made on the sailboat, that here in Samos over 2500 years ago, the forces and mysteries of nature may be "principles, forces, laws of nature…This is the place where science was born. That's why we're here" (18:22). Like a pilgrimage to the Black Stone (al-Ḥajar al-Aswad) or to Jerusalem, Sagan is in Samos as a kind of metaphorical 'holy site' for the origins of a thinking methodology that would eventually lead to the methods of science as we understand it today. A place of enchantment that Sagan wishes to show exists in the world.



Carl Sagan on a pier on the island of Samos, explaining one of the earliest experiments that Sagan attributes to science, done by Anaximander (APV Ep. 7 - 20:37).

This “holy site”, Sagan explains, was made possible because of the merchants and traders who lived and travelled to the lands of the Ionian League. The people, predominantly middle-class, ruled, and their businesses required innovation. Technology thrived, and so did thought. Sagan, walking along a pier, introduces Thales and details some of Thales’ ideas and works, but concludes that Thales’ conclusions being correct or not isn’t what’s critical; what is is “his approach. The world was not made by the gods” (20:00), but by material forces. Sagan then introduces Anaximander, a friend of Thales, who first proposed the heliocentric model. Through a cut and transition stylistically reflective of the 1980s, Sagan suddenly appears on the mountain visible behind him, which he turns to face in the previous frame. He

begins by discussing Polycrates' tyrannical rule over Samos and detailing Herodotus' description of his great engineering projects, such as a 1 km-long aqueduct through the mountain. This was a time, Sagan says, of great engineering works and systems of thinking, like those from Theodorus of Samos, "when the practical and the theoretical were one" (23:13).

For Taylor, Sagan would be detailing a place and time in our ancient past when the profane was more culturally embedded in the actions and deeds of the people than the sacred, when building great works could be for the material benefit of this world's inhabitants, rather than the benefit of deities from beyond the world. Sagan is also presenting a historiography that, akin to Taylor's, frames free inquiry, free trade, and decentralized power as pathways to prosperity and flourishing. Much of Sagan's narrative depends on viewing the history of science as a development over generations, which Druyan and Sagan are keen to instill the label of "ancestors." To be aware of the long road to the present, where children can hold pictures taken hundreds of millions of kilometres away, close to the gas giants of our solar system, is to understand a story of the world that is itself enchanting.

The camera zooms out of the cave and transitions as if coming out of a nightshade flower as Johann Sebastian Bach's "Air on G String" begins to play, and an array of other flowers appear on screen. Sagan says, "This new hybrid of abstract thought and everyday experience blossomed into science…they began to uncover hidden wonders and breathtaking possibilities" (23:37). That the world was calculable, or that it could be known, was a way of enriching the world, to make it a Cosmos to which we belonged. One such momentous hidden possibility, Sagan discusses, was uncovered by Empedocles, who designed the "water thief", which leads to a discussion of Democritus. Sagan tells us, "the mind of Democritus soared" (27:23) as he is said to have written extensively on many topics, including correctly speculating on the plurality of worlds, and that stars make up the glow of the Milky Way.

Sagan continues detailing some of the many thoughts that Democritus had before tense drums begin, and Sagan explains that this time of thinking was ending as he passes a one-hundred drachma note, which had Democritus' face, and is crumpled slowly.

The drums continue, and Sagan introduces Pythagoras, who was also from Samos of Ionia. Marking the legend of the Cave of Pythagoras, which Sagan walks out of, and notes and foreshadows with the Orthodox Church, which now sits just beside the cave's mouth, Sagan presents a conflicted view of Pythagoras. Noting the many mathematical principles and terms Pythagoras developed, including the term Cosmos, Sagan also notes, while looking away from the camera and at the vistas of the Greek island, that Pythagoras and his followers were not experimentalists and that "the laws of nature could be deduced by pure thought" (34:22). The Pythagoreans were, Sagan claims, "thoroughgoing mystics" (34:30), as the scene changes to white regular solid polygons spinning in a black void. Sagan details the theory of the geometric shapes and their associated elements, with Earth, for example, being the cube.

Sitting outside Pythagoras' cave, Sagan then holds a dodecahedron, the "substance of the heavens" (35:15), and explains how it was considered too dangerous for the public. Loving whole numbers, the Pythagoreans, having figured out that the square root of two was an irrational number, which, according to the Pythagoreans, suggested that "their worldview might not make sense: the other meaning of irrational" (36:16). The Pythagoreans suppressed this knowledge, which Sagan explains is antithetical to the processes of science. This move, towards thought alone and suppression of knowledge for only specific classes, was taken up, Sagan claims, by one of Pythagoras' most notable followers, Plato. Sagan, back in Pythagoras's cave, holds a lantern that casts shadows on the wall, foreshadowing the consequences of Pythagoras's worldview. Sagan explicitly lays the stifling of this enlightenment in the Greek islands to Pythagoras and the developments from Plato,

something that would hold even until Johannes Kepler over 1900 years later. Sagan concludes that the reason the methods of science developed in Ionia were lost is that this new method "provided, I believe, an intellectually respectable justification for a corrupt social order" (38:44).

Sagan continues his attack on the Pythagoreans and the philosophers of the Western canon, standing on a large rock and making some of his boldest and most direct claims in the series. "You could get richer if you owned a lot of slaves" (38:58), he says morosely. "Plato and Aristotle were comfortable in a slave society. They offered justifications for oppression. They served tyrants. They taught the alienation of the body from the mind, a natural enough idea, I suppose, in a slave society. They separated thought from matter. They divorced the Earth from the Heavens. Divisions that would dominate Western thought for more than 2,000 years. The Pythagoreans had won" (39:46). Sagan's rhetoric here is unmistakably that of the conflict thesis—victors and vanquished, a decisive battle whose outcome shaped millennia. That the Grand Cosmic Narrative deploys this rhetoric at key moments, even as its larger architecture points toward a more complex and integrative vision, is itself significant. It suggests that the GCN has not fully escaped the gravitational pull of the conflict framework; it borrows the conflict thesis for dramatic framing even as it seeks to redirect towards different ends. This internal tension within the GCN may itself help to explain why its massive cultural reach has not more decisively eroded the conflict thesis in the popular imagination: the narrative sometimes reinforces the very framework it elsewhere subverts.

Sagan begins making his way down the mountain as expansive vistas of the island and the cave from afar are shown as Sagan's voiceover begins. Sagan laments the changes that occurred, which were taken up by the Platonists and later by Christians, such as Augustine of Hippo. Sagan confidently states that "their influence has significantly set back the human endeavour" (40:26). Whether this judgment is historically fair is a question beyond the scope

of my analysis, but what matters is that Sagan's narrative constructs these figures as obstacles, and that this construction itself carries weight.

By the time of the Renaissance, Ionian ideas would return, but the damage was already done. The Earth was viewed as "tainted, somehow nasty. While the heavens were pristine and divine" (41:48), any idea of the Earth as a planet and of us as citizens of the Cosmos was forgotten. But this idea was introduced during the old Ionian period by Aristarchus of Samos. Sagan details his many incredible thoughts, many of which are typically associated with Copernicus. Sagan notes that the manuscript for Copernicus' *De revolutionibus orbium coelestium (On the Revolutions of the Heavenly Spheres)* (1543) included a reference to Aristarchus, but it was suppressed for publication. A calming, yet sad flute and lute play a duet, reflecting the duality of knowledge and ignorance, freedom and suppression.

Aristarchus pushed on the curtain hiding the scale of the solar system, but to go beyond it, "you need a telescope" (44:19). Actors dressed in 17th-century Dutch attire appear on screen, looking through a telescope, as Sagan says it was during this time that astronomers could finally get a "rough estimate of the distance to the sun. Once you knew the distance to the sun, what about the stars?" (44:34). The music becomes upbeat and lively, a full orchestral score as Sagan appears on the screen with the Ionian coast in the background. He asks how far the sun would need to be to appear like a star in the night sky, the same question Sagan opened the episode with and asked as a young boy in Brooklyn. Christiaan Huygens (1629-1695), Sagan says, devised an experiment to figure out just this: a disk with different-sized holes was used to measure sunlight, comparing its relative brightness to the recalled brightness of Sirius at night. Huygens estimated twenty-eight thousand times further, about half a light-year. This is wrong, but a remarkable achievement because Sirius is much

brighter, so if you account for the intrinsic brightness, he would have landed at the correct answer (8.8 light-years) using his memory and a bronze disk with holes.

Sagan's historical work for this episode was drawn from a collection of 16 books, most notably George Sarton's (1884-1956) *A History of Science (Vol 1): Ancient Science Through the Golden Age of Greece* (1953) and *A History of Science (Vol 2): Hellenistic Science and Culture in the Last Three Centuries B.C.* (1959). As the founder of the premier journal for the field of history of science, *ISIS*, and the History of Science Society (HSS), Sarton is considered the founder of the field, as well as an early proponent of the integration of philosophy into the history of science. The books by Sagan *et al.* used for this episode will no doubt be dated today, but they fulfilled the purpose of telling an interesting story that would impress upon the audience a narrative that demonstrated the importance of inquiry, curiosity, and seeing the world as more than an object of control and subjugation.[16]

Sagan fades out, and an image of many stars slowly moves across the screen in interstellar space. Sagan asks whether there are planets and beings around those stars. Do they wonder as we do? Sagan is back in the classroom, having students help perform a demonstration of transit photometry, a method used to find exoplanets. All the children stare wide-eyed at the experiment, craning their heads to see. He has students show another method to the class: radial velocity. He explains that when the students are adults, they will know whether there are indeed "dozens or hundreds" of planets around other stars for "the first time in the history of the world" (50:34), which, in 2025, is over 5,500 (NASA). Sagan continues to expand outward from our solar system to our galaxy and beyond, impressing upon the fifth graders the scale and wonder of knowing these details, and the hard work and mysteries revealed in pursuing them.

[16] For the complete list of works used for this episode of APV, see Sagan 1980: 352-353.

Cosmos: A Spacetime Odyssey

Although the ASO episode is in a different order from APV, I selected it because of its thematic connections to the APV episode and to the content of this chapter. Thematically, childhood curiosity and wonder, including questioning authority and developing knowledge that we today take for granted through a historical lens, are present here, which is observed in the opening scene of the episode, as a baby lies in a basket tucked into a blanket under the stars, their light reflected in the baby's eyes. Gentle strings slowly draw out sustained *sostenuto* tones: "We were born into a mystery…under a blanket of stars" (01:52), Tyson says. "Like an abandoned baby left on a doorstep without a note to explain where we came from, who we are…we've had to figure it all out for ourselves" (02:13). Horns join the strings in a crescendo, and Tyson reaches down to grab the baby from the basket and cradles it in his arms. "The best thing we had going for us was our intelligence, especially our gift of pattern recognition sharpened over eons of evolution" (02:28). The camera zooms out, and Tyson and the baby are standing on a rocky surface with the Milky Way moving across the night sky behind them. As a slow, moving French horns play, "Cultures all over the planet looked up at the same stars and found different pictures there" (02:51), as different images are shown on screen as the French horns play a contemplative melody. Each image, traced out among the stars on screen, represents various cultural constellation patterns, such as a farmer, a hand, and an emu, traced over the same patch of night sky we call Orion the Hunter. "We used this gift…to read the calendar in the sky" (03:04), and the camera rushes past Tyson and the baby into the night sky.



A baby looks into the night sky with stars reflecting off its eyes. The theme of curiosity and wonder play prominently in this episode (ASO Ep. 3 - 01:35).

This opening sequence echoes the themes of episode three of APV, but does so in a way that emphasizes humanity's cosmic connection with the broader world. The baby's reflecting eyes looking up into the night sky, the emphasized Milky Way, the hints of analogy between the lifecycle of a young human being and the maturing knowledge of cultures, all reflective of the core themes in the episode analyzed in APV above. However, as we will see in this episode, an even greater emphasis is on the relationship between knowing the world through the scientific endeavour and the enchantment of the world via understanding it.

The scene shifts to an animated band of wanderers as Tyson begins a voiceover, detailing how the "calendar in the sky" was used to make and leave camps, and when herds, rains, and cold would come; the animation reflects these changes. Tyson speculates that such a connection between celestial events and earthly events led our ancestors to conclude "naturally, that what happens up there must be directed at us down here…what else could it be but a message?" (03:41). So, Tyson concludes while standing on the same rocky surface

without the baby, “when the Heavenly order was suddenly violated by the apparition of a comet in the sky, they took it personally” (03:50) as an animated tribe reacts to the bright blue tail of a comet in the night sky. Tyson asks how they could know what it was, concluding that “every ancient culture made the same mistake: a comet must be a message…And almost invariably, our ancestors concluded the news was not good” (04:18).

The music sharpens, turning ominous, with deep bass and an eerie, soft screeching. Tyson lists several civilizations, like Aztec, Anglo-Saxon, Babylonian, and Hindu, all of which shared the same belief in comets as portents of doom, with varying descriptions of the subsequent ‘disaster’: etymologically “as in the Greek word for ‘bad star’” (04:40). A sequence of mixed animations and live-action shows scenes of devilish sketches of comets, skeleton faces, and famished, bloody, and diseased people, as the music is drawn, slowly and melancholy. This sequence captures what Taylor refers to as “porous” people, or, as Weber details, those people who were enchanted before rationalization: the comet was interpreted as imbued with meaning, such as melancholy and black bile. Here, the comet is a sign of doom, a messenger from beyond our plane of existence, a symbol of transcendent disapproval. This is enchantment of the unknown in its most direct expression: the comet’s meaning is not derived from calculation but from the porous self’s vulnerability to a Cosmos experienced as charged with moral and spiritual agency.

Tyson describes the ancient Chinese as “remarkably systematic. Starting in roughly 1400 BC, they began recording and cataloguing” (05:11) comets, with different tail lines signifying different disasters that would occur. “Pattern recognition”, Tyson explains, as a light spins around the perimeter of a white disk revealing a face, “is a two-edged sword” (05:25). But as the light swirls towards the centre, the face becomes nothing more than dimples, bumps, and craters as the disk pans away: “false pattern recognition” (05:34). “We hunger for significance,” Tyson claims, “signs that our personal existence is of special

meaning to the universe", but it leads to deception, finding a "sacred image in a grilled cheese sandwich" (05:55). Finding a divine warning in a comet during what Taylor refers to as sacred time, before the secular, caused worry and panic, but with the Ship of the Imagination, Tyson reminds us that it is "fuelled by equal parts science and wonder, can take us anywhere in space and time" (06:16).

One light-year from the sun, outside the viewfinder, a haloish cloud encloses our Sun. Tyson stands in front of the large screen and says, "These are the snows of yesteryear" (06:37). The Oort Cloud, named after the Dutch astronomer Jan Oort (1900-1992), "who foretold its existence back in 1950" (06:52). A man, dressed in a long black coat and grey rimmed hat, 'phases' beside Tyson, whom he calls Oort. Oort and others, including his wife Johanna Maria (1906–1993), wondered where comets kept coming from and if the ones we see ought to have been pulled in by the larger outer planets. After calculating the rate of new appearances versus expected losses, Oort concluded that there ought to be a large concentration at the edge of the sun's gravity. No one has seen the Oort Cloud, and each comet is as far away from its neighbour as Earth from Saturn, but "science gives us special powers of our own. It gave Jan Oort the gift of prophecy" (08:17), including calculating with a high degree of certainty our place in the Milky Way. It found the spiral structure of it with the first use of a radio telescope. Tyson asks, "Does the fact that most of us know the names of mass murderers but never heard of Jan Oort say anything about us?" (08:56).

This rather direct, reflective statement could be viewed as a symptom of the disenchantment that Weber and Taylor wrote about. The popularity of crime shows, like the long-running *Law and Order* (1990-) and its many spinoffs, or the popularity of *Dahmer – Monster: The Jeffrey Dahmer Story* (2022) as one of the top-streamed Netflix shows, speaks, perhaps, to the values associated with the public rooted in the profane, that of the present and the worldly. The interest in murderous criminals tends to shy away from abstract ideals, and,

especially in the case of the Netflix show, focuses on the titular character in an attempt to psychologize Dahmer and the culture of the time, i.e., racial-cultural biases in the US. Weber would view this as symptomatic of the transition to calculability and the rationalization of Dahmer's actions; Taylor would note how fully the show explains him within the immanent frame, his pathology and his culture accounting for him without reference to anything beyond them.[17] In both, what is notable is how completely the show frames Dahmer in worldly terms, without appeal to anything beyond them. I am by no means condemning this framing, as the racial violence of the United States is indeed a subject that should not be ignored. But the interest in the murderer and the tie-in with racialized aspects in the wake of the murder of George Floyd in 2020 raises questions about the motivations behind the narrative framing. Ultimately, one is left asking: what ideals remain that strive to "transcend" the profane when everything is rooted in the ills of the world?

SotI is shown again, reflecting the Oort Cloud off its mirrored surface. Tyson details how comets can become liberated "from their gravitational bondage to the sun" (09:27), with some flung from our solar system, and some having "a different fate" (09:39). Tyson takes his seat in the sole chair on the ship's deck as SotI begins pursuit of a ball of ice "plunging towards the sun, gaining speed" (09:48), and provides a scenario of how a comet is sent inward. The music picks up, with strings quickly striking in a dramatic tone, as the sun's "heat bakes it" (10:23) and the comet's surface erupts, revealing a "glowing halo and a tail" (10:42) and its history. The scene returns to the animation of the tribe from the episode's beginning, staring "in helpless wonder" (11:13), with only "our guilt and our fears" (11:20), as Taylor would agree.

[17] Taylor's discussion of horror as secular transcendence in *A Secular Age* suggests a counter-dynamic where horror opens onto experiences beyond the immanent frame, true crime's psychologizing impulse works to close them down, rendering the monstrous calculable.

Tyson walks towards the camera, heading East along Trinity Lane, which runs alongside the walls of Trinity College at the University of Cambridge. “But then a friendship began between two men which began a permanent revolution in human thought” (11:28), and the scene transitions back to animation of two men walking through an English town. “Isaac Newton and Edmond Halley could not know it, but their collaboration would ultimately set us free from our long confinement on this tiny world” (11:41). The music swells triumphantly with the horn section crescendoing. Throughout this chapter, I have been balancing a fine line between, on the one hand, accepting disenchantment as a macro-psychosocial phenomenon that has occurred, more or less as Taylor and others have detailed. But on the other hand, I have also not committed fully to that position, in that I agree with scholars who claim the enchantment still is around us, if you know where to look. But this tension, I think, is most realized in the difference between macro disenchantment and micro enchantment.

This macro/micro distinction—between the structural persistence of disenchantment at the societal level and the lived experience of re-enchantment at the individual or subcultural level—is, I argue, the single most important analytical tool for resolving the tension that runs through this dissertation. Taylor’s concept of the ‘nova effect’ is instructive here. In a secular age, the macro-level conditions of disenchantment do not eliminate enchantment but rather pluralize it, scattering it across an ever-expanding array of micro-level options from institutional religion to New Age spirituality to the Grand Cosmic Narrative. The conflict thesis operates at the macro level, as a structural feature of the disenchanted public sphere. The GCN critically, however, operates at both the micro and macro levels, as one among many re-enchantment options available to individuals navigating Taylor’s ‘nova’, while simultaneously being scaled to and presented to the whole world.

Recall that in Chapter Two, I spent much time unpacking grand narratives, looking at the grand narratives of science and the origin of its modern use, as discussed by Lyotard, who

was part of the postmodernist movement in cultural philosophy. The tension above clarifies my motivation to balance the two and my overall thesis position. Grand narratives have a population-level effect. Benedict Anderson's widely read and influential text, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (1983), shows how print-capitalism wove a shared story of national belonging among what would otherwise be strangers, demonstrating how narratives operate as an objective social force, in particular concerning nationalism, forming a political community. The *Postmodern Condition* claims that there is a "crisis of narratives" (Lyotard 1984: xxiii), that a postmodern society has an "incredulity toward metanarratives" (Lyotard 1984: xxiv).

So, how can we have metanarratives all around us, yet also be postmodern and distrust them? I suggest we should resist the temptation to resolve this question too neatly, and in particular, we should resist the Lyotardian resolution that would treat the GCN as evidence that postmodernity has been superseded. The more honest answer may be that we live in a condition of productive incoherence: metanarratives circulate, are consumed, and are even loved, but they do so without commanding the universal assent that characterized their pre-modern predecessors. The GCN is a metanarrative that is consumed as one option among many, which is to say it is a metanarrative operating under postmodern conditions, not a metanarrative that has escaped them. This meta-conflict, if I may, this tension in the abstract framing of our place in the world, is, I claim, a source of our disenchantment. It is through belonging to smaller groups, such as Dungeons and Dragons clubs, running groups, urbanism movements like Strong Towns, or occult interest groups as outlined by Josephson-Storm (2017), that we imagine the possibility of a world imbued with meaning. When Tyson claims that Edmond Halley and Isaac Newton's "collaboration would ultimately set us free from our long confinement on this tiny world", he is, via Druyan, inviting the viewer to imagine the world as rich with possibility and meaning, pointing to a grand narrative, a Grand Cosmic

Narrative, that encompasses and celebrates the wealth of the world's cultures as unique expressions of this cosmic story.

Tyson continues that "the comet of 1664 sent shivers of dread throughout Europe" (11:52), which seemed "justified" when the Great Plague and the Great Fire of London began only a year and two later. An animated sequence begins, with a voiceover of a woman reading a section of Guillaume de Saluste du Bartas' (1544-1590) poem which was included at the beginning of *An Astronomical Description of the Late Comet or Blazing Star, as it Appeared in New-England in the 9th, 10th, 11th, and the Beginning of the 12th Moneth, 1664: Together with a Brief Theological Application Thereof* (1665) by Samuel Danforth (1626-1674). The animated sequence includes frightening images that mirror the words the woman recites. But then a young boy emerges from a high balcony door and approaches a bronze telescope. Tyson says, "But for one child, the comet was not the least bit frightening" (12:51), as the boy looks through the telescope to observe the comet. "For him, it was a thing of wonder. Like all of us, Edmond Halley was born curious" (13:04). Tyson details Halley's nurturing upbringing, primarily due to his Father's wealth as a soap maker, which allowed him, among other advantages, to travel to St Helena to make the first starmap of the Southern Hemisphere (1676-1678). Tyson then appears beside the very map Halley created, standing in a room at the Royal Society in London. The map "created a sensation" (14:12),[18] giving sailors navigational details that greatly assisted their expansion into the global south, which quickly led to Halley's Fellowship with the Royal Society.

Tyson begins outlining the Royal Society, including its motto, "'*Nullius in verba*', it sums up the heart of the scientific method. It's Latin for "see for yourself", Tyson says (14:31).[19] In other words: question authority" (14:34). Tyson introduces the Fellow who

[18] I take the meaning of sensation here to be closely aligned with Secord's (2000) use of the term.
[19] The direct translation is "on the word of no one."

nominated Halley, Robert Hooke (1635-1703), who can't be shown because "no portrait… exists" (14:43), except contemporaries' descriptions of "'mean', 'bent', 'ugly'" (14:49). Despite this, he was "possibly the most inventive person who ever lived" and the "most sought-after party guest in all of London" (14:57). Why, Tyson asks? His "insatiable curiosity encompassed absolutely everything" (15:03), and a bookshelf swipes the camera to transition to an animation of alien-looking creatures, coils, a brain, and a microscope. Hooke invented the compound microscope and called the "little Cosmos" he saw in it "the cell" (15:13). He anticipated elements of Darwin's work, improved the telescope, and made highly accurate drawings of his telescopic viewings. He even "partnered with the architect Christopher Wren (1632-1723) to redesign and rebuild" (15:42) London after the Great Fire. Tyson outlines many other developments, discoveries, and experiments by Hooke, including those related to cannabis.

"But coffee was the drug of choice for England" (16:24). A xylophone brightens and quickens the music's pace, and the camera moves into the Ye Olde Mitre pub in Farringdon, London. Tyson sits at a table, sipping a coffee. Coffee houses, which "sprang up all over London" (16:28), were an "oasis of equality in a class-obsessed society… a kind of laboratory of democracy" (16:59) to exchange ideas and hear news. Halley and Hooke met Christopher Wren in a coffee house to "discuss a deep mystery: Why do the planets move as they do?" (17:10). The camera zooms into Tyson's coffee and transitions to an animation of Halley, Hooke, and Wren sitting, drinking coffee, and discussing the problem. Hooke, Halley, and Wren couldn't figure it out, though Hooke claimed he could. Tyson appears on the Great Court, or Nevile's Court, inside Trinity College's grounds at Cambridge, and asks, "What about that mathematician at Cambridge?" (18:28), who solved questions about the nature of light, invented the reflecting telescope, and was also a recluse. "Halley wondered if this strange, and by all accounts exceedingly difficult man, might succeed where Hooke and

others had failed" (18:57). Tyson continues onto Trinity's Fellows' Bowling Green, the music building anticipation, "what no one could possibly imagine at the time, were the countless ways that the world would be forever changed by this meeting on an August day in 1684" (19:09).

Tyson's voiceover begins with an animated humble home appearing amid snowfall: "Isaac Newton was born in England on Christmas Day in 1642" (19:23). Tyson details his upbringing, shown through animation. In 1661, he enrolled at Cambridge and was a "consistently lousy student" (20:06), with no "friends or loving family for warmth or encouragement" (20:12). A recluse, he hid in his rooms at home during the Great Plague and Trinity, studying ancient and natural philosophers. He was a "passionate mystic" (20:31) who practiced alchemy, aiming to uncover ancient secrets, and was "obsessed with finding hidden messages in the words of the Bible" (20:57), conducting biblical numerology and hermeneutics; these endeavours "never led anywhere" (21:23). When Halley met with Newton that "fateful August day, he was living as a virtual recluse" (21:35), going "into hiding 13 years earlier" (21:41) after Hooke's accusation of Newton stealing his work on light and optics.

Newton and Halley sit in Newton's dark, cluttered, messy room. Halley, voiced by Cary Elwes, introduces himself and explains his purpose for the visit. Newton already calculated that the "attraction of gravity weakens with the square of the distance…some five years ago" (22:51), and Halley exclaims, "I beg you, show it to me!" (22:53). Newton cannot find it. The scene transitions back to Tyson sitting at a large desk in the Royal Society, "Just when Halley may have begun to wonder if Newton was bluffing, as Hooke had done earlier, a messenger arrived…from Newton" (23:21).

The orchestra swells, and the composition "The Cosmos is Yours" begins, with powerful strings resonating with emotion, as Tyson flips through a collection of pages with

the words *Philosophiæ Naturalis Principia Mathematica - De motu corporum in gyrum* written in cursive at the top. “Here are the opening pages of modern science with its all-embracing vision of nature…and for the Cosmos” (23:40). We transition back to animation in Newton’s chambers, with Halley holding the papers Tyson presumably just had, “Mr Newton”, Halley pleads, “I beseech you to work all of this into a book as soon as possible” (23:49). Tyson tells how *De Historia piscium* (*History of Fish*) (1686), an “impressive book, extremely comprehensive…filled with lavish illustrations” (24:20) of fish, nearly bankrupted the Royal Society rendering it unable to afford to publish Newton’s work; they were “so strapped for cash” that they had to “pay poor Halley’s salary” in copies of the book (24:38).



Tyson holds pages of Newton’s letter, visibly moved, as he gently looks through them (ASO Ep. 3 - 23:21).

“Halley resolved to not only edit Newton’s book, but to publish it at his own expense” (25:25), and we see animation of Halley watching over a pressman. The first two volumes laid the “mathematical framework for the physics of motion” (25:31), while the third “would settle once and for all who won the coffeehouse wager” (25:37) by applying his two volumes’ principles to the motions of the celestial bodies. The music begins to build, and Halley stands

beside the pressman as he takes the final sheet off the printer and hands it to Halley; on it, in the upper right quadrant, reads *Philosophiæ Naturalis Principia Mathematica.* The music crescendos, and Tyson fades in, holding what appears to be an original of Newton's book. "If it wasn't for Halley, Newton's great book would've never been conceived, nor written, nor printed" (27:33), he says as he places the book on the desk. "Okay, so what?" Tyson asks the viewer, "What difference does that make to us? What's the big deal?" (27:40), staring concernedly into the camera.

Newton's family home, Woolsthorpe Manor, fades into view. "When Isaac Newton was born in this house…the world was very different. Everyone looked at the perfection of the clockwork motions…and could only understand it as the work of a master clockmaker…God" (28:11). The camera moves inside the nearby watermill, the shadows of gears rotating cast on a brick wall, "Along came Newton, a God-loving man…He could write the laws of nature in perfect mathematical sentences. Formulas that applied universally…Gravity is the clock maker" (29:13), Tyson says, staring at the camera sternly among the support framing of the watermill. The *Principia* also included the "first sound theoretical basis for an end to our imprisonment on Earth" (29:36), Tyson continues outside the watermill.

Two factors worth noting are present here. The first is the brushing over of Newton's religious and theological views and works. Throughout this episode, references to Newton's "mysticism" and "God-loving" nature are made, and I have attempted to incorporate them into this analysis. I think this is a fair way to present Newton, given the episode's narrative aims; yet, the emphasis here is on his contributions to the sciences, specifically physics. Newton wrote thousands of pages on theology and other biblical-adjacent studies (The Newton Project 2025). He was a profoundly religious thinker, if not unconventional in his Christianity in rejecting the trinitarian nature of God (Jones 2011: 61). But this leads into the

second, in that Newton is being, and has been for some time, adopted into the pantheon of the heroes of science, a trait that should be recognizable from the description of the Epic of Evolution. I argue that *Cosmos* makes this more tangible by emphasizing the narrative's cultural and historical nature. Instead of hiding Newton's religiosity, they reveal it, even providing a detailed animated sequence that explores his works in biblical numerology and alchemy. Newton's birth on Christmas is emphasized, and his home is featured as a filming location. Not only is Newton portrayed as a hero of science, but *Cosmos*, I argue, frames him as a type of secular saint. A figure who helps the episode's *true* 'hero' give meaning to the episode's title, "When Knowledge Conquered Fear." The hagiographic framing—the Christmas birth, the filming at Woolsthorpe Manor as a kind of secular shrine, the narrative arc from suffering and isolation to world-historical revelation—is enchantment of the narrative at its most explicit, investing the history of science with the structural and affective conventions of sacred biography.

An animated sequence plays out Newton's conjectures on firing a cannonball at increasing velocity and thrust, eventually breaking "the bounds of gravity…This changed everything" (30:05). The cannonball fired in the animated demo begins to orbit the Earth and the sound of 'shock diamonds'—the cracking of air pressure from rocket launches—begins as the Saturn V rocket launch fades into view. A lengthy launch video is shown, featuring images of the moon landing and many other craft launched into space and onto other planets in our Solar System, culminating with Voyager sailing past Jupiter. The Suleymaniye Mosque is shown, followed by the Hagia Sophia Grand Mosque, and a young Muslim girl, looking through what are clearly AR glasses, reading what appears to be mathematical formulas. Tyson's voice comes back, "Newton's *Principia Mathematica* set us free in another way…he decoupled the motions of the heavens from their ancient connections to our fears" (31:22).

As Newton was deeply religious, his *Principia* was a vital contribution to a type of natural theology-natural philosophy hybrid that scholars have referred to as "physico-theology" (Polkinghorne 2013). When he published the second edition of the *Principia* in 1713, he added the "General Scholium", which included, among other topics, a theological account of his work adapted from his writings over the previous years. It gave Newton the space to defend himself against some critical notes against his work, the famous "I do not frame hypotheses", and to touch upon subjects he wanted to explore more deeply. Becoming President of the Royal Society in 1703, Newton then held a position of relative authority and could speak to issues he may not have been comfortable with before (Ducheyne 2007: 250); the episode of *Cosmos* here emphasizes his insecurity. However, I would argue that *Cosmos* makes a relatively straightforward claim to the "fears" that we became decoupled from within the context of this episode's narrative, which we will explore now.

Tyson sits back at the Royal Society in London, the music soft and reflective, "If Halley hadn't been standing next to Newton for all those years, perhaps the world would remember him for his own host of accomplishments and discoveries" (31:36), rather than the comet he never discovered. A lengthy animated sequence of Halley's accomplishments unfolds, including leading three expeditions to improve nautical navigation on behalf of King William III, creating the first map of Earth's magnetic field, and inventing the weather map, which features symbols still used today. Tyson walks along the Champ de Mars in Paris, with scenes of people and the Eiffel Tower being shown, as he explains how Halley also "laid the groundwork" (33:29) for population statistics by comparing metrics in both London and Paris. And, Tyson continues, it was Halley "who gave us the actual scale of the solar system" (34:03) by urging viewing and recording the transit of Venus across the sun, which was accomplished "twenty-seven years after Halley's death" (34:18), which included Captain James Cook in Tahiti.

Emphasis is placed here on the purposeful pursuit of knowledge and the gathering of people for a common goal that will endure after one has died. This type of framing is done throughout *Cosmos* as a passing of knowledge, experience, and hope from generation to generation. This view is very much antithetical to Weber's work, as the pursuit of science, in this GCN sense, invigorates communities through calls to action that unite the globe (Wulf 2012). Knowledge and calculation transcend time and space, motivate people to action and instill a sense of purpose, meaning, and connection. Taylor would likely agree with this as he is disinterested in framing science as the mover of disenchantment, but instead by the "sense of things", how disenchantment in the metaphysical underpinnings of our culture is "imagined, and therefore experienced" (2007: 325).

Back on the rocks facing the night sky from the episode's opening, Tyson explains that Halley was "the first to realize that the so-called 'fixed' stars were not fixed at all. How'd he do it?" (33:47) Tyson asks, "He poured over the observations made by the ancient Greek astronomers of the brightest stars" (34:54), and he "compared their observations with the ones he himself made of the same stars 1800 years later" (35:00). But why hadn't anyone noticed, Tyson asks? Halley figured out that changes in star positions would only be noticeable given long periods "between observations…you would need to track them for many centuries before you could detect that they moved at all" (35:20); this was the first hint of stellar motion in the Milky Way. The comet that bears his name, Tyson recounts, was found by Halley, setting out "to solve this mystery as a detective would by gathering all credible eyewitness testimony" (36:00), the earliest being from Constantinople by Nikephoros Gergoras in June 1337.

He found all the recordings he could in Europe from 1472 to 1698. "Now here comes the hard part" (36:31), Tyson says, building tension. "Halley had to take the observations made for each comet and find the shape of its actual path through space" (36:37), with

Newton's "new set of laws" (36:42), the first known use of them from anyone aside from Newton. "In an arduous tour de force of mathematical brilliance, Halley discovered that comets were bound to the Sun in long elliptical orbits" (36:52). He was the first to know that the comets in 1531, Tyson swipes his hand across the night sky, tracing a glowing soft-blue line with his hand to represent the historical comets path, "1607, and 1682 were one and the same…In a stunning example of try pattern recognition, he predicted it would be seen again more than fifty years in the future" (37:21) as the screen fades to pages of Halley's 1705 text, *A Synopsis of the Astronomy of Comets,* on a desk with a burning candle.

Comets were no longer just the realm of mystics, "Halley shattered their monopoly, beating them at their own game, a game that no scientist had ever played before: prophecy" (37:40). Tyson leans towards the camera, holding his gaze as the music becomes angelic and choral. "Halley stated flatly that the comet would return at the end of 1758, from a particular part of the sky, following a specific path" (37:57), as Tyson draws out its path. "There is hardly a prophecy attempted by the mystics that ever even strives for comparable precision" (38:03). The word "prophecy" is doing deliberate work here, and the registers of enchantment are layered. On one level, this is enchantment of the revealed: Halley's prediction, grounded in Newton's laws, discloses the calculable order of the Cosmos with a precision that itself inspires awe. But the narrative framing—the language of prophecy, the angelic choral score, the invocation of a knowledge that outlives the knower—sacralizes the achievement, investing it with the affective register of the transcendent. This is enchantment of the narrative operating in concert with enchantment of the revealed, and it is characteristic of the GCN's rhetorical method: scientific knowledge provides the content, but narrative framing provides the existential charge.



Tyson traces the path of historical comets to detail how Halley applied Newton's work to astronomical bodies (ASO Ep. 3 - 37:13).

Tyson turns towards the stars, and the digital rendering of Halley's comet appears on screen, with its bright blue-glow tail as the music swells. The Ship of the Imagination rushes towards and past the camera, moving towards a floating object in space. Inside SotI, Tyson points to the object through the viewfinder, "That's Halley's comet", which "out here at the edge of the solar system…doesn't look like much" but will soon "begin its long fall" back towards the sun (38:52). Tyson details the sun's gravitational pull on all the solar system's bodies using a virtual model projected by SotI. The scene transitions back to an animation of Newton sitting in an armchair by the fire in the Royal Society. Tyson explains that Newton had become President of the Royal Society a few months after the death of Robert Hooke, and here he also details the mystery of the supposed missing portrait of Hooke, which they show Newton casting into the fire, noting that it is just a story.

As for Halley, he died at the age of 85, and his final act "was to call for a glass of wine. He downed it with pleasure and breathed his last breath" (39:57), as the portrait of Halley acts this out. The scene transitions once more to the digital rendering of Halley's

comet, this time with its distinct glowing blue tail. “But Halley’s prophecy was not forgotten” (40:28), Tyson says as he notes how 50 years after Halley’s death, people across the globe “vied to be the first to catch sight” of the comet (40:35); “It’s been welcomed back every 76 years since” (40:42). The music begins softly and gently, using piano chords in contemplative tones, as Tyson describes what happens as it approaches the sun. Returning in 2061, “May you feel the wonder of all those who came before you and none of the fear” (41:16), as an animated young girl comes out of an automated door and onto a balcony, putting on glasses similar to the AR glasses from before. Newton’s laws allowed Halley to see into the future, as they also enabled us to break free from Earth, travel to the moon, and send craft beyond it, as shown in photos from the Apollo missions and satellites.

But Tyson shares “one last prophecy” (41:53) as the music swells into the full orchestral score of Alan Silvestri’s powerful “Halley’s Comet”. “Using nothing more than Newton’s laws of gravitation…several billion years from now…the Milky Way…will merge with our neighbouring galaxy Andromeda” (42:09). A digital simulation begins of the two galaxies approaching and colliding, with the music now taking the audible front as they merge and interact in a fluid-dynamic “dance of a half a trillion stars to music first heard on one little world by a man who had but one true friend” (42:42). The music crescendos as the galactic cores begin to coalesce, merging into one, and the episode ends.

Conclusion

The ideas of the secular, disenchantment, and re-enchantment, and the aims of the writers on these themes, reveal a spectrum of positions—a complexity—rather than a simple binary. Weber argued that rationalization and intellectualization have disenchanted society, draining it of meaning in a process he understood as largely irreversible. Latour, Levine, and others have countered that science and technology have not disenchanted humanity because humans

have never been removed from the networks of meaning that modernity claims to have dissolved—science does not strip meaning as Weber described. Taylor, for his part, occupies a more complex position than either pole: through *A Secular Age*, he reveals that what Weber diagnosed as disenchantment is better understood as a transformation of the background conditions of belief—the metaphysical underpinnings of our worldview, the experience and feeling of it, and his sense of secular version three. For Taylor, transcendence has not disappeared but has become optional, and the secular age is defined not by the absence of meaning but by the proliferation of competing sources of it. To situate myself in this debate, I put forth a position closest to Taylor's but informed by the ontological correctives of Latour and Levine. While I agree that disenchantment is a real social phenomenon occurring in modern society, which Weber likely experienced when he spoke a century ago in the wake of World War I, and Taylor has grasped in his long life during the 20th and 21st centuries, I contend that disenchantment is not a necessary consequence of scientific rationalization. This project aims to show how science *has been* narratively drawn to produce meaning—as the GCN demonstrates—rather than to argue that it *should be*. It may provide us with a rational and intellectual understanding of the world, but it by no means has to be devoid of meaning, wonder, and mystery.

This chapter has examined the concepts of secularization, secularism, disenchantment, and re-enchantment within the context of the North Atlantic world. I spent time on these topics to illuminate in detail what is part of the mechanisms that have led to the formation and popularity of the Grand Cosmic Narrative. I aimed to lay some of the groundwork for understanding the macro-cultural conditions that I believe are necessary for constructing and operating a narrative form that both takes disenchantment as an actual phenomenon and seeks to re-enchant the story of science, people, and the world from a secular perspective. With these elements in place, I briefly provided some context for the emergence of space as a

source of inspiration for ethical and motivational concern for the Earth, using images of the Earth taken by the Apollo missions. I then detailed how the content of this chapter and my position, as described, are revealed in the *Cosmos* programme, examining two episodes that explore the collaborative and inquisitive nature of science, as well as the means by which it enchants the world.

In establishing the contents of this chapter, I aim to build on them in the next chapter by introducing two essential concepts that have been raised in this chapter and have permeated the project thus far: narrative and myth. While I have already examined the Epic of Evolution and the Humanist Blockbusters as narratives of science, I have not yet detailed the philosophical and theoretical implications of these terms. This will be important for understanding the power of a narrative like the grand cosmic narrative and the possible reasons why it is so popular in today's cultural and textual landscape. I should note, in closing this discussion, that the GCN's popularity and the persistence of the conflict thesis are not, in the end, contradictory; they are co-constitutive features of what Taylor calls our 'secular age.' The very conditions that sustain the conflict thesis—disenchantment, institutional secularization, the fragmentation of shared meaning—also generate the appetite for the kind of re-enchantment the GCN offers. The GCN is popular not despite the dominance of the conflict thesis but, in part, because of it. The GCN is a response to a felt absence, a hunger for meaning and place and coherence that the conflict framework makes difficult to sustain, for all its cultural tenacity, and that it conspicuously fails to satisfy.

Chapter Four

Narrative, Myth, and Affect

Every one of us is, in the Cosmic Perspective, precious. If a human disagrees with you, let them live. In a hundred billion galaxies, you will not find another.

– Carl Sagan, *Cosmos*

Introduction

One of the hallmarks of grand narratives of science, as Lightman (2010), Hall (2021), and others (Secord 2000) have outlined, is an attempt at situating the reader, broadly defined, in a vast Cosmos; to make the reader not feel as though they are small, their values empty, and their purpose void, in an increasingly known universe—especially during the 19th century. As I have done throughout this dissertation, I have steadily been laying the foundations for building up something that takes these narratives to the next level, the Grand Cosmic Narrative, by detailing in the preceding chapters the complex interplay between science and religion, grand narrative types of science, and a philosophical investigation into secularism, aesthetics, environmental and moral philosophy. This journey began with exploring the history of science and religion to provide context for the work at hand, and a detailed dive into the project's primary example—*Cosmos*. I then presented narratives of and on science, such as *Naturphilosophie*, the Epic of Evolution, and the Humanist Blockbuster, which

historians of science have identified as having been used and written about since at least the late 18th century. As others have noted, these narrative types have similarities to religious narratives. However, it is my position, and one of the aims of this project, that the Grand Cosmic Narrative is, while also shifting towards secularism and (in some cases) retaining non-theistic religious qualities, undeniably more concerned with building a moral value system that borrows theological-like frameworks and is framed within a planetary (or cosmic) ethic, and all that this entails.

The Grand Cosmic Narrative's central premise is to inform, motivate, and capture the *hearts and minds* of viewers by not merely presenting a chronological recollection of past events and detailing facts about the history of science and our present understanding of the universe to inspire moments of awe and wonder, but to push beyond that into forming a sustaining grand narrative or meta-narrative that sets up a willingness to pursue profound inquiries and encourage thoughts of cosmic consciousness, to instill the world with meaning, to be respected, and to know the world more deeply. As such, this project has thus far sought to intricately weave a historical and philosophical tapestry that has highlighted the pivotal moments where narratives, science, and religion intersect, diverge, and influence the cultural zeitgeist in keeping with the lessons of complexity as a principle and paradigm of research into the interactions of science and religion. Complexity makes us aware that the creation, promotion, and popularity of something like the Grand Cosmic Narrative is an active, dynamic interplay of elements – narrative structure, visual construction, metaphors and meanings, political contexts, and more. These elements are the building blocks of perception, the architects of public understanding, and inform the engagement with the grand themes of science and religion in the Grand Cosmic Narrative, motivating the popular mind to think and reflect on these themes in relation to this narrative form.

Chapter Three, however, marked a critical transition for us in exploring the Grand Cosmic Narrative, as it led to a deep dive into the historical and cultural contexts that, I argue, helped shape the interaction between science and religion through grand narrative forms. I brought in work on secularism, disenchantment and re-enchantment so that we could dissect how shifts in societal values, political and technological advancements, and philosophical thought have influenced the perception and portrayal of these two seemingly disparate realms and the influence that they have had in the role of self-reflection, keeping in mind the content of narrative and the role it plays in orienting human values and belonging. That chapter, though, served as part one of a two-part philosophical investigation along our journey.

Chapter Four continues this philosophical and cultural direction, building upon Chapter Three and the enchantment taxonomy developed there, by shifting the focus to the intrinsic elements of narrative itself. What makes narratives compelling and resonant, and some of the mechanisms that may be at work in the orientation of the Grand Cosmic Narrative, are similar to those of religious narrative. We will briefly explore the concept of narrative and its role in shaping cultures and identities before delving into myth, examining its function as a mechanism that transcends cultural and temporal boundaries. I will draw on Hans Blumenberg's (1920–1996) work here, a German philosopher and professor at the University of Münster, who has become renowned for his contributions to the fields of metaphorology, myth, and the intellectual foundations of modernity. We will then follow this with a section on the role of affect, examining how emotional resonance strengthens narrative and makes it a potent force in shaping public perception and sentiment, drawing on the work of Donovan Schaefer, Associate Professor of Religious Studies at the University of Pennsylvania, and others. The final section of this chapter will examine episode one from

both *Cosmos* series, *A Personal Voyage* and *A Spacetime Odyssey*, to highlight the concepts covered.

Narrative and Its Role

Running throughout this dissertation has been a constant reference to narrative—narratives of science, narratives of religion, narratives of the secular, and so on. However, as of yet, I have not substantively examined narrative—What is it? How does it work? What does it mean? Why is it important? Chapter four is where this changes. This concept is critical for my proposed framework on the Grand Cosmic Narrative; it's in the title! So, in this first part, I will briefly outline the narrative and explore scholarship on religion, science, and their communication and popularization. We will then explore the role of story in narrative and its importance in the human drama.

To put it simply, narrative is "the representation of an event or series of events" (Abbott 2014: 13). This clearly distinguishes it from the relaying of facts and details. "I am Anthony" is not a narrative; it is a statement of fact. If I tell you that I am typing this sentence with my headphones on, listening to lo-fi music, and wearing my glasses, that, too, is a statement of fact and provides details of my current circumstances. But it is not a narrative. I could ask questions, posit a claim, or perform several other communicative language acts, but they may not contain a narrative. It will not be a narrative without representation, direction, and chronology. If, instead, I told you a story about my motivation for writing this project, dating back to my first Master's degree in sociology, and discussed the trials and challenges along the way, perhaps including a lesson learned, we would be on the right path towards constructing a narrative. But direct statements of facts and matters of fact are not narrative. H Porter Abbott, Research Professor Emeritus in the English Department at the University of California, Santa Barbara, states that two primary narrative uses exist. The first is "compact

and definable," most often associated with stories in popular culture or the more readily available claims made in public discourse (Abbott 2014: 14). The second is "loose and generally recognizable," which could be, for example, the notion of the identity of Canadian-ness or the milestones of life (Abbott 2014: 14).

Narrative operates through specific components, each serving a distinct purpose in constructing and interpreting stories. These components are characters (the agents through which the narrative unfolds, the personified entities that the audience relates to, empathizes with, or opposes); plot (the sequence of events that comprise the narrative, the backbone, dictating the flow and structure of the story); setting (the time and place in which the narrative occurs, providing context and background, influencing the narrative's tone and mood); conflict (the central challenge or problem around which the narrative revolves, the driving force of the narrative, propelling the plot and engaging the audience); and resolution (the culmination of the narrative, where the conflict is resolved, providing closure, concluding the narrative journey) (Abbott 2014: 24). Taken together, these create a story, but narrative differentiates itself chiefly from story in that narrative is representational while story is the temporal flow of events. This can also have a bi-temporal aspect, in that a narrative is experienced in two times—that of the reader and that of the story world. However, for us, critically, narrative serves as the representational background that supports and places the elements of a story within an abstract whole.

But this 'background' of narrative doesn't only belong to the realm of story. Narrative, in Abbott's second sense, is the fundamental psychosocial mechanism through which we interpret and operate in reality. It is the principal means by which we impart and comprehend the complexities of our lived experiences. Jerome Bruner (1915-2016), the late University Professor Emeritus at New York University's Law School, was a pivotal figure in cognitive psychology who worked on a range of developmental and educational topics. He

posited that narrative is a mode of thought, a means through which individuals make sense of the world, grapple with experiences and communicate with others (1991).

Bruner put forth "an idea that may not be quite ready" (2004: 691) in awareness of the inability to demonstrate his thesis that narrative is the basic tool of sense-making and orientation in our lives, but he was not alone in making such a claim (Peterson 1999). Bruner, adopting a constructivist approach, argues for two theses. First, "we seem to have no other way of describing 'lived time' save in the form of a narrative" (Bruner 2004: 692). In simple terms, this means that to speak of life and the experience of "lived time" *is to tell a story*. Relaying information about one's life is a process that details the elements, noted above, that make a story a story. More than that, however, it is a narrative in that "one imposes criteria of rightness on the self-report of a life just as one imposes them on the account of a football game or the report of an event in nature" (Bruner 2004: 693). We make choices about which information to share, selecting what is right and wrong, and create inclusion criteria based on the context of our storytelling aims. We, as the tellers of our autobiographical story, narrate the details of our lives in relation to the context of the telling, adjusting what we tell to fit the narrative of who we wish to be, the political context of the situation, or whatever. We are not relaying facts but weaving our details into something connected, relatable, and meaningful.

The second related thesis is that "narrative imitates life, life imitates narrative" (Bruner 2004: 692). Our experience of, and the telling of, our lives, and our orientation towards the world, are informed by and shaped through the experiences derived from and motivated by narrative forms. We experience life as having a grand beginning—our birth—and it is filled with events that fluctuate in meaningfulness throughout. We also have an ultimate conclusion—the inevitability of death.[20] Our lives are, in a very real way, like a

[20] This is perhaps why we have developed such rich and complex spiritual narratives that include supernatural planes of existence so that death is not the end of one's story, but the beginning of a new chapter. See "Terror Management Theory" from anthropologist Ernest Becker's 1973 book *The*

story, with the narrative structures of storytelling built into their natural structure. We take solace in life stories, whether fiction or nonfiction, especially autobiographies, as they reflect the pattern of our lives and offer meaningful content from which to reflect upon our experiences. Bruner states, reflecting on Jean-Paul Sartre's 1964 autobiography where he claims that humans are storytelling creatures, that "life stories must mesh, so to speak, within a community of life stories; tellers and listeners must share some 'deep structure' about the nature of a 'life,' for if the rules of life-telling are altogether arbitrary, tellers and listeners will surely be alienated by a failure to grasp what the other is saying or what he thinks the other is hearing" (Bruner 2004: 693). Narrative is not just about the communication of details about lives or events, but is foundational to the construction of culture and the norms that culture deems acceptable. Our experiences, conveyed through narrative, guide us as we navigate the complexities of our cultural and social landscapes, imbuing events and interactions with meaning and continuity.

Bruner's two speculative theses on the nature of narrative in its role in human interaction highlight narratives' dual function: a means of personal orientation and a mechanism for cultural transmission. Narrative is both imitative and necessary. Yet he is also keenly aware of the reflexive nature of narrative, highlighting the overlap that reflexivity plays in most lived experiences (ibid.). He posits that our life narratives are continually shaped and reshaped through interaction with the broader cultural narratives surrounding us. The interplay between personal and cultural narratives allows individuals to situate themselves within their social and historical contexts, providing a sense of identity and belonging to both the present and the past. In other words, the development of a personal narrative is influenced and shaped by the cultural narrative, whether it is aligned with it or

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Denial of Death and Jeff Greenberg, Sheldon Solomon, and Tom Pyszczynski's 2015 social psychology book *The Worm at the Core: On the Role of Death in Life*.

diverges from it. Over the course of adolescence and young emerging adulthood, the importance of coherent personal identity narratives and cultural narratives has been shown to yield greater psychological outcomes for those whose personal narratives are exploratory yet stably compatible with cultural norms (Doeselaar et al., 2019; Branje et al., 2021; Waters & Fivush, 2016).

Narratives are not only formed at a personal and autobiographical level but also build up to higher levels of complexity and organizational size. This directly connects with the discussion of Charles Taylor's work in Chapter Three on secularism and the conditions of belief—the narratives of nations are intertwined with feedback loops from the people who live their lives according to the values and meanings of those national narratives. In other words, the people's collective narratives feed into larger narratives at various levels of organization, including the company, institutions, the state, and so on. These, in turn, feed back and influence how people self-narrate, tell stories, and so on. In positing narrative this way, Bruner contributed to understanding how narratives function as tools of identity and place, enabling individuals to organize their experiences, articulate their values and beliefs, and engage with the world around them.

Returning to Bruner's comment regarding Jean-Paul Sartre's claim that we are storytelling creatures, this is a position held by several writers, including Jonathan Gottschall, whose 2012 book, *The Storytelling Animal: How Stories Make Us Human,* argues that humans are, fundamentally, storytelling creatures. Drawing on neuroscience and evolutionary psychology, Gottschall argues that our brains are "wired" to understand the world through narrative structures and that this ability to engage in storytelling has been crucial to our evolutionary success. Our success, Gottschal continues, is due to stories acting as mental simulations, like an Olympic diver mentally going through each move before they jump. This has allowed us to practice navigating complex social situations and understand hypothetical

scenarios without being in any immediate danger. These simulations teach us valuable lessons and offer potential solutions to our individual and collective challenges. The narratives of these stories are pooled and collectively provide a shared set of values, ideals, ideas, and experiences. In doing so, stories can help build communities and strengthen social bonds. Moreover, we construct our own identities through the narratives in which we are collectively involved—in the stories we hear and tell about ourselves to others—as we constantly construct and reconstruct these narratives, both collectively and individually, over time (Gottschall 2012).

Walter Fisher (1931-2018), Professor Emeritus of communication at the University of Southern California, also approached narrative as inherent to the human animal. He claimed that human beings are *homo narrans* ("storytelling human"), that we make sense of the world primarily through stories rather than through logical arguments or strict rationality (1989: xiii). This is predicated upon two primary points, narrative coherence and narrative fidelity (Fisher 1989: 88). The former implies that a story holds together or makes sense internally and involves consistent characters, actions, and events, and so on; the latter that the truthfulness or reliability of the story is determined by whether the values and experiences conveyed in the narrative align with the listener's own beliefs and experiences. Identifying these two together forms what Fisher put forth as the Narrative Paradigm (1989: 57). The Narrative Paradigm has four presuppositions: 1) humans are storytellers; 2) decision-making is done through narrative consideration—through story—and will change depending on the context of the communication situation; 3) 'good reasons' are informed by the language used in a complex array of inputs from history, politics, culture, biography, etc.; and 4) rationality is *determined* by persons as narrative animals (Fisher 1989: 64).

Of course, not everyone agrees with Fisher's thesis, and there are reasons to be skeptical. One might object that rational thought, devoid of story, can still influence decision-

making and that narrative is merely one mode of evaluation among others. Yet it is telling that when popular culture attempts to personify such pure rationality, it does so through narrative. The half-human, half-Vulcan Spock of the *Star Trek* franchise is perhaps the most obvious cultural image of the rational agent unencumbered by story, affect, and value. But Spock is himself a narrative construction, and the character's dramatic arc across the decades of the brand's existence consistently demonstrates the inadequacy of logic detached from human meaning-making. Spock's rationality is never vindicated on its own terms; instead, it is shown to require supplementation by precisely the kinds of affective, value-laden judgments that Fisher places at the centre of the narrative paradigm.

That our most compelling cultural attempt to imagine non-narrative rationality can only be articulated through narrative is suggestive, though I am careful not to overstate the case. The Spock example demonstrates that popular culture struggles to represent pure rationality outside of narrative structures, but this tells us more about the conventions of television storytelling than about the ontological necessity of narrative itself. What the example does usefully illustrate, and this is sufficient for our purposes here, is that narrative remains the dominant mode through which publics encounter and evaluate claims about rationality, science, and meaning. I claim this suggests that Fisher's thesis is more difficult to escape than its critics suppose.

Furthermore, it is crucial to understand the role of objective claims in the creation of narratives and the consequences of claiming that individuals both inform and reshape cultural narratives, and vice versa, as this can lead to problematic views of typical sources of authority and reliance. For example, the narrative work surrounding COVID-19 highlights the importance of engaging with distortions of "empirical reality" that threaten liberal norms, values, and human lives. Nowhere in the above was the idea of objective narrative validity mentioned; yet it would be imperative to consider and challenge such stories, such as anti-

vaccination and climate change denial, on empirical, scientifically informed grounds (Whitehead 2023).

This leads us to science, which, yes, also contains narratives. Seemingly cold and rational, as per Weber and the "disenchanters," science has a reputation for being factual and unbound by the compositional elements of a story. Yet narrative is not merely a vehicle for communicating scientific findings to lay audiences. Scholarship in Science and Technology Studies (STS) has shown that narrative operates at the level of scientific practice itself, for example, in the construction of hypotheses, the design of experiments, and the formation of theoretical frameworks (Kuhn 1962; Latour and Woolgar 1986). Science popularization and science communication, in turn, amplify and formalize these already-narrative structures, employing linguistic and rhetorical strategies that resonate in meaningful and impactful ways (Padian 2018). This distinction matters. If narrative were only a feature of how science is *presented*, one could maintain a clean boundary between scientific rationality and storytelling. But if scientific reasoning is itself narratively constituted, then the presence of narrative in science communication is not a distortion but an extension of something intrinsic to the enterprise of science.

Moreover, literary scholars attentive to historical contexts, most notably Gillian Beer (1983) and George Levine (1988), pioneered thinking about the impacts of science on narratives and culture. Early scholarship from Gillian Beer (1983), Emeritus Professor of English Literature and Honorary Fellow of Clare Hall and Girton College in Cambridge, and George Levine (1988), Professor of English Literature Emeritus at Rutgers University, both were influential in revealing the way that narrative and linguistic choices in science had wide-ranging cultural effects on contemporary natural historians and philosophers and the arts like writers. In fact, the benefits of storytelling and narrative construction in public comprehension, interest, and engagement of science have been documented (Dahlstrom 2014:

13618). Michael Dahlstrom, Dean's Professor of Liberal Arts and Sciences at Iowa State University, argues that scientists and science communicators should adopt strategic narrative and storytelling approaches to publicize their work, making their findings more accessible and engaging to the public. He argues that this approach enhances science communication and understanding, as traditional logical-scientific formats can often be difficult for non-scientists to comprehend. Engagement is usually mediated by the platform trends of the time, such as TikTok (ibid). If we take the core claims of Bruner, Gottschal, and Fisher as underlying the importance of narrative in shaping human values, judgments, etc., and the role that narrative feeds into collective understandings of self and community, then narratives in science are a critical component of an informed public.[21]

So, narrative is essential for science, our daily lives, and our collective well-being. Another psychologist and former scholar has examined the role of narrative—especially in relation to religion—and its role in orienting oneself in cultural contexts; for better or worse, this scholar and his work have been a major source of contemporary discourse on narrative in people's lives. Jordan B. Peterson, former Professor of Psychology at the University of Toronto, rose to public attention in 2016 when he claimed that Bill C-16 was legislation that compelled and limited speech (by introducing gender and identity expression discrimination codes into federal law). Now this isn't the place to detail these events, but I do so to warn the reader that Peterson, as he is now—a public figure—is not whom I will be engaging with. I restrict myself to his 1999 book, *Maps of Meaning: The Architecture of Belief*, an ambitious work written while an Assistant and later Associate Professor at Harvard University. It delves into the cognitive structure of belief systems, how myths and religions shape human understanding, and the significance of narrative frameworks in interpreting the world.

[21] I will return to science communication scholarship in more depth in chapter five.

I am of the mind that Peterson's book is worth consideration, regardless of his public and often outlandish public lectures,[22] and, in looking at reviews of the book dating to within two years of the book's publication date, it is clear that others thought so as well, with only his rise in popularity(/notoriety) and his subsequent positions in opposition to identity groups giving rise to negative or scathing reviews. I am putting that aside, as I find it unconvincing, and in certain respects uncharitable to the complexity of Peterson's project and obviously ideologically driven. While one may reasonably disagree with Peterson's interpretive framework—and there is much to disagree with—dismissing the entirety of his engagement with mythic structures requires a more sustained critique than the reviews in question provide. In *Maps of Meaning*, Peterson introduces an important but familiar concept of the world as a "forum for action" (1999: 1). By this, he means the world is a place of things that have a direct bearing on the actions and interpretations of people, as the things of the world (influenced by both the order of the world and the chaos beneath and behind it) give rise to our interpretations of the world. This, in turn, generates the construction of narratives, some of which may become legends and myths depending on their strength and longevity. However, all narratives, regardless of their status, serve as the "maps of meaning" that allow us to navigate the complexities of reality and to give order to chaos.

One of the most notable aspects of *Maps of Meaning* is Peterson's focus on the duality of chaos and order, a theme he has, for better or worse,[23] carried forward with him. He presents this duality as the fundamental archetype that shapes our narratives and belief systems. Influenced heavily by the psychoanalytic tradition of Carl Jung (1875-1961), chaos

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[22] After all, much of "critical studies" areas use Martin Heidegger's work even though he was Rector of the University of Frieberg following Adolf Hitler's political victory in April 1933, and joined the Party the following month. There are instances throughout his work of anti-semitism, and clear reports of his sympathies with Nazi activist students and the ideals of the Party. I draw this analogy not to state that Peterson is a Nazi, only that the Academy cannot be dismissive of one former scholar's work and not of the others when the stakes seem much more serious for the scholar's works who are used often!

[23] The duality between order and chaos has become his *modus operandi*, even inspiring the titles and contents of his two popular and wildly popular works from which his world tour lectures are based.

is associated with the unknown and the potential for transformation it entails. Chaos is beyond control. It is the space where reality and unpredictability meet, and it is this unpredictability that makes chaos essential for creativity and innovation. On the other hand, order is linked to the known, the structural and the systemic, such as our personal habits, the way we cross the street, and the language we use. Order is also associated with authority or legitimization, which here is much like the Emeritus Professor of Philosophy at the University of Paris VIII: Vincennes—Saint-Denis, Jacques Rancière's conception of the policing of the known versus the unknown.[24] Peterson uses this dichotomy to suggest how all cultures construct narratives that navigate between these two extremes, enabling individuals to make sense of their existence. It is why, for example, the great mythologies of the world, universally and independently created across the globe, share in their structure the duality of order and chaos, such as life and death in the Epic of Gilgamesh, the "waters of the deep" and the forming of the world in Genesis, or the Hymn of Creation in the Rig Veda, or even the Cold War mentality of Capitalism versus Communism,[25] as but a tiny fraction of examples. Peterson argues that stories provide a template for individuals to structure their lives, offering a sense of meaning and orientation in a complex and sometimes unpredictable world. Thus, chaos is not in opposition to order, but rather in a complex and sometimes mutually beneficial entanglement with it.

Peterson proposes, like Gottschal, that the human mind is innately predisposed to use narrative structures to organize experience and that cultural and historical contexts deeply influence narratives, shaping the process by which individuals and societies construct their

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[24] Rancière' says "The police is thus first an order of bodies that defines the allocation of ways of doing, ways of being, and ways of saying, and sees that those bodies are assigned by name to a particular palace and task; it is an order of the visible and the sayable that sees that a particular activity is visible and another not, that this speech is understood as discourse and another as noise" ([1995] 1999: 28)

[25] Peterson spends some time on this duality in the book and spent much of his professional academic career working on the role of psychology in this difference.

'maps of meaning' through cyclical patterns of re-establishment, similar to Hans-Georg Gadamer's hermeneutical circles ([1975] 2013). For example, rituals, symbols, and religious practices reinforce the tangential and connected maps of meaning formulated through the practice of, and communion with, such actions. These practices are situated in both the order and chaos of the past, present, and future, as they belong to a tradition (past) of formulated practices that are reinforced through socialization and action, yet are also negotiating the present and susceptible to the changes of the present, which alter the future direction they may take. In other words, these acts are bridges between the known and the unknown, the individual and the collective.

Peterson claims that narrative depends, in large part, on belief; it acts as a "forum for action" which "reduces the manifold meaning of the experiential plenum to a restricted and therefore manageable domain" (1999: 226). Exploring the psychological significance of belief systems, Peterson posits that individuals confront and assimilate the unknown into their maps of meaning through a process drawn from Jungian psychoanalytic theory and the hero archetype: an individual's journey to confront chaos, learn from challenges, and return transformed to a newly established kingdom of order. This process lies at the heart of personal growth and the development of a resilient, adaptive belief system. Critically, however, Peterson's framework is monistic; it posits a single archetypal narrative structure that underlies all functional meaning-making, from religious cosmology to individual psychological development. The question of whether narratives operate at different scales—whether a grand narrative like Christianity functions differently from the smaller-scale narratives of contemporary ideological movements—requires a different theoretical register. It is here that Lyotard's (1984) distinction between grand narratives (*grands récits*) and smaller-scale narratives (*petits récits*) becomes instructive. The maps of meaning we construct are not merely subjective interpretations; they are vital to our survival in social and

political worlds and to our psychological well-being. Yet these maps may operate at vastly different scales, and the relationship between grand and smaller-scale narratives—whether the former subsumes the latter, as Peterson would suggest, or whether the latter have proliferated precisely because the former have lost credibility, as Lyotard argues—is central to understanding how narrative functions in contemporary culture. That large blockbuster films, such as the *Avatar* franchise, offer a window into environmental stewardship reflects this dynamic: a local narrative about ecological responsibility nested within, or perhaps substituting for, a grander narrative of human purpose (Erb 2014).

Peterson's reach is broad, and this is just one criticism directed towards his work, both generally and currently. He draws on neuroscience, evolutionary psychology, evolutionary anthropology (closely related), theology, religious studies, and literary studies, among others, to support his argument. I am sympathetic to the evolutionary application in this case. Prof. Robin Dunbar, Professor Emeritus of Evolutionary Psychology at Oxford University, author of the 2022 book *How Religion Evolved: And Why It Endures*, treats religion and spirituality as synonymous, offering no theological speculation. This is the "science," or as close as we can be, of the spiritual. Dunbar uses the term "the mystical stance" to capture the universality of this phenomenon. That virtually all documented civilizations and groups exhibit cognitive-affective orientations toward domains of experience understood as exceeding ordinary material life, and the affectual "raw" feeling of religiosity, or simply the immersion in religious experience, is substantive here. Importantly, "the mystical stance" deliberately sidesteps the well-known genealogical critique that "religion" as a distinct category is a modern, largely post-Reformation taxonomic invention (Asad 1993; Nongbri 2013; Smith 1963). Dunbar is not carving out a separate sphere called "religion"; he is identifying an evolved cognitive-affective capacity, rooted in endorphin systems, trance states, and the neuroscience of communitas, that manifests cross-culturally and cross-temporally regardless

of whether a given civilization taxonomized it as distinct from the rest of life. Indeed, even in cosmologies where the sacred thoroughly pervades everyday existence, we still find vision quests, initiatory rites, ascetic disciplines, and ecstatic practices that mark certain experiences as qualitatively intensified encounters with the numinous. This suggests that being "always already" in relation to the transcendent does not eliminate the experiential gradient described by Dunbar's framework.

Dunbar's work supports my overall claim in highlighting the significance of narrative in the strength and longevity of religion-like practices, arguing that rituals, such as dance, song, and storytelling, facilitate endorphin release and are essential for group bonding. This is important because, as the studies of the synaptic responses of the brain that Dunbar (and others) conducted show, narrative forms (which include dance and song) enforce group bonding and thereby create stronger ties of community.[26] This, coupled with the passage of time, highlights the relevance of myth for narrative and its role in world-building and meaning-making. Dunbar's 'mystical stance' functions only if there is a narrative structure from which the stance can be orientated, or more simply, the mystical, at least insofar as it enters public discourse and shared cultural life, only exists if there is a story of it. The private, unmediated mystical experience may well be real in its own terms, but it becomes culturally legible and available for analysis, transmission, and collective meaning-making only when it is narrativized.

This connects two points from the previous discussion on narrative, which will be tied into the next section and this project's discussion. First, narrative plays a critical role in our lives, consciously and unconsciously. This narrative framework suggests that our actions are based on the meanings we ascribe to objects and events rather than their objective existence

[26] It is at this point that Peterson has taken beyond the scope of his book's argument and has expanded, monetized, and taken on global tours.

in space and time. Narrative builds worlds and (in)forms realities. Therefore, the psychological significance of stories in structuring human experience and understanding cannot be overstated. This is absolutely critical for us as the thrust of the Grand Cosmic Narrative is to world-build a more holistic, encompassing, thoughtful existence. Second, because narrative is such a powerful tool in the human toolbox, its strength is best seen, in historical terms, in the role of myth, which I shall discuss now.

The "Reoccupation" of Myth

I have spent much time throughout this dissertation situating this work as a unique intersection of science and religion. From a secularist perspective, this intersection reveals itself most as a creation of myth, similar to what E.O. Wilson envisioned the Epic of Evolution could become. However, it would be beneficial to explore what a myth is in this context. The concept of myth goes back to the ancient Greek word *mythos,* which signified any oral communication, essentially meaning "living word" or "living speech" (Paden 1994). This highlights the linguistic and cultural structure of ancient Greek life: our popular perceptions of it as permeated by gods and heroes, art and literature are largely accurate, since these forms of cultural expression were, quite literally, infused into the norms and practices of these ancient peoples. However, as Greek culture advanced, matured, and spread to dominate the Mediterranean, the concept of mythos and its meaning underwent a semantic shift, coming to signify the ancient and the sacred—the origins of the world, cosmogony, gods, and demigods, among other things. It came to represent a distant past, more or less enchanted compared to the new present. With the rise of the philosophers (and the Sophists), it became more distant from, and in strong contrast to, *epos* (word as human narration) and *logos* (word as rational construction).

This reveals two important points I want to touch on briefly. The first is the conception of 'word' as meta, as above and/or beyond, permeating a culture widely throughout. It is here that the idea of myth develops into the grand narrative sense, as its origins demarcate the broad reach of *mythos* as the cultural sum of Greek expressive life (Ivanova, Sadovnikov & Balabay 2020). This signals to us the importance of the term 'myth' for this project, giving weight to the all-encompassing nature of the Grand Cosmic Narrative as not only of science or religion, but of all possible expressions, whatever they may be, that arise from the world. The second is the place of the "word" in myth in the mature sense. The most notable example in our culture is, of course, Genesis, where God's words "Let there be light" literally brings forth the world (Coogan 2010: 11). The Gospel of John radicalizes this further: "In the beginning was the Word, and the Word was with God, and the Word was God" (John 1:1), elevating *logos* from divine speech act to the ontological ground of creation itself, the principle through which "all things were made" (John 1:3).[27] In the Quran, this trajectory reaches its fullest expression in the identification of text with divine voice: the Quran is considered the literal 'Word of Allah' (God), sent down verbatim to the Prophet Muhammad. Unlike the Bible, it is not merely inspired by Allah, but is regarded as Allah's direct speech, without human addition or alteration (El-Bizri 2021: 394).

The importance of this divide—the semantic shift that occurred during the reign of the ancient Greeks—remains with us today, albeit to some extent. The narratives of myth that grapple with timeless existential questions about the nature of reality, the human condition, and our place in the Cosmos are sometimes (and often, depending on the context) categorized as the imaginary. Even though myths have had an enduring value in shaping literally all civilizations throughout history, in the North Atlantic world's thought, the secularization that

[27] See Charles Harold Dodd's classic 1953 book, *The Interpretation of the Fourth Gospel* from Cambridge University Press.

has occurred over the past 400 years has, as Taylor argued (outlined in Chapter Three), relegated myth as an option, one among many, so that myths are now, to some, seen as something dated, cult-like, and unsophisticated. The ideas of progress, rationalism, science, and even literature, as well as the roles of the Roman Catholic and Protestant churches, contributed to the relegation of myth to the archaic, the prelogical, and the fictional. However, a fascinating point emerges, raising the concept of "historical distance."

Historical distance is a metaphor—a way of theorizing about the past in relation to the present (Hollander, Paul, and Peters 2011). It encompasses a spectrum of dimensional considerations when thinking with and through creating historiography.[28] This includes but is not limited to temporal, cultural, social, epistemological, and methodological divergences between the historian and their subject of historical inquiry. This spectrum of possibilities, encompassed within the concept of historical distance, underscores the inherent challenges in thinking about, writing on, and reflecting through the filter of the present, which always obscures the past. Understanding historical distance facilitates a nuanced comprehension of historical phenomena in relation to present-day contexts (Phillips 2004). It is, in a certain respect, a motivational framework from which the Complexity Principle in the humanities and some social sciences of science and religion operates.[29]

The similarity between the two disciplines becomes apparent when examining the dimensions above. Historical distance is the gap between current observers and historical events, highlighting the inherent challenges of reconstructing past realities without direct experience. The reliance on extant documents, artifacts, and historiographical interpretations increases with the passage of time between the object of study and the researcher. Cultural

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[28] I remember using this term with Mark Philips, Emeritus Professor of History at Carleton University, to describe how I viewed his work on historical distance, as his aptly titled 2013 book *On Historical Distance* was the central text of the graduate class I was taking with him.

[29] This is likely the reason why the Complexity Principle came from a historian, as John Brooke would have been familiar with these considerations already and wanted them to inform discussions on interactions between science and religion.

and social distance refer to the variations in values, norms, and societal structures that distinguish past societies from contemporary ones. Epistemological distance refers to the disparate frameworks of understanding and belief systems that inform the perceptions and actions of historical actors. This aspect challenges any appraisal of the epistemological underpinnings of past epochs, acknowledging that what constitutes "knowledge" and "truth" has changed over time. Each of these forms a spectrum of considerations inherent in historical distance, forcing historians to reflect on the consequences of the gulf separating them from their historical subjects (Phillips 2013). Each demands that we be contextual and conscious of our biases and affiliations before "jumping the gun" in making conclusions with uncharitable pretenses.

I bring historical distance into the discussion because we can adopt it in our thinking about the construction of myth as an object of the past and the consequences that distance raises for our considerations of it here in the present. For example, the Greeks, who originated our lexicon of linguistic understanding, coined the term *mythos*, alluding to the all-encompassing nature of what we today would consider mythological structures throughout Greek culture. Today, we intuitively grasp that Greek gods and heroes, as well as the stories of great trials, are myths and legends. Some universities have entire teaching and research programmes dedicated to the view that these are *just* the narratives of an ancient culture. Without attempting to be controversial, and while recognizing that this framing will be uncomfortable for some readers, it is analytically defensible to consider the narratives of the Abrahamic faiths—particularly as they have been received and reinterpreted across centuries of cultural transmission—through the lens of myth in the technical, Eliadean sense of the term. This is not to make a claim about their truth or falsity, but to observe that they function, sociologically, in ways that parallel the mythic structures we have been examining. We have the historical distance to render the Greek gods as nothing more than anthropomorphic

conceptions of the natural process of the Earth, human activity, life generally, and death. We do *not yet* have the historical distance, perhaps, to render the likes of God, Allah, and Yahweh as reconstructions and modifiers of this historical cultural precedent.

Take, for example, the position of the small but rapidly growing demographic group of "spiritual but not religious," which I have maintained is integral to this dissertation and has been highlighted throughout this work. Some in theology argue that this is perhaps a weak methodological commitment, spurred by the natural tendency for religious sentiment, that they cannot commit to the *modus operandi* of established religion for whatever reason (Fergusson 2024). David Fergusson, the Regius Professor of Divinity at Cambridge, argues that environmental movements have much the same spiritual dimension to them as established faiths "with its language of the sacred, its reverence for nature, and its quest for creaturely harmony" (Fergusson 2024: 15). But, regardless of this similarity, there is resistance to drawing that similarity out from both sides (those of faith and those who are environmentally spiritual), but "merely to dismiss successful adaptations of faith as ways of internalising secular values or hollowing them out from within seems somewhat contrived" (ibid.).

This point—the adaptation of faith—is critical to our discussion here. If, as Fergusson, Dunbar and others, and entire research programmes fields like Cognitive Science of Religion have claimed, that the nature of religion is a universal property of the human species, then the inherent quality of the human disposition towards the beyond, transcendent, even divine, means that the historical distance we have and the conclusions we arrive at as a result point towards the adaptability and, if I may, survivability of meaning-making narrative forms—in this case, myth. It is no coincidence that the Grand Cosmic Narrative is closely aligned with environmentalism, natural religion, eco-spiritualism, and other forms of eco-conscious-raising groups—the Cosmos revealed through the Grand Cosmic Narrative and our

profoundly interconnected relationship to it and everything in it is a meaningful story that encompasses everything and everyone. It has mythic qualities, as Druyan made clear in the introduction to the re-release of the *Cosmos* companion book, which details the beginning of time itself, offering prophetic claims through prediction and hypothesis.[30]

But what, precisely, do I mean by myth? I adopt Robert A. Segal's, Professor of Theories of Religion at the University of Lancaster, simple definition that a myth is a story about something significant, held tenaciously by adherents (2015: 5-6). Significance is the key operator here, as it can refer to anything that has meaning, purpose, and value for those subjected to the myth. Significance in this respect varies from culture to culture and, increasingly, from community to community in today's digital landscape. However, this significance is quite hard to define. What makes a myth have significance? Why would a myth gain significance? The prominent macro-scale myths, like the American Dream or the Genesis account of Creation, not only offer examples of significance through story but also embed within them reality-making meanings and effects on identity and cultural orientation that promote and demand tenacious adherence. Note how both examples span a range of ages: while the American Dream may be a few centuries old (though popularized during the Great Depression), Genesis is millennia old. Time is an essential factor in myth, changing a story from something merely heard to something embodied.

Time helps reveal significance, and to work towards a fuller answer, I contend that the work of Hans Blumenberg's metaphorology, which has resurfaced and garnered popularity in various disciplines over the last decade, is the most fruitful. By way of introduction to Blumenburg, I want to engage with the work of Terence Keel, a cross-appointed professor between the Department of African American Studies and the UCLA Institute for Society &

[30] This is a critical point that needs more time spent on than I can do in this project, but the fact that environmental sciences can make claims about the future state of the world in apocalyptic terms is an area of research that must be explored further.

Genetics at the University of California, Los Angeles, in his 2018 book, *Divine Variations: How Christian Thought Became Racial Science*. At a glance, *Divine Variations* is about revealing how race is indebted to Christian theology. However, this book is significant because Keel employs race as a mediating point to integrate his perspective into the fields of science, religion, and secular studies. Keel reveals that the narratives of Christian theology and its effect on science demonstrate a traceable lineage of thinking about race that extends from the eighteenth century into modernity. Furthermore, the unintentional position taken in the book is that secular modernity is more of a fantasy than a claim to actuality, similar to the late French philosopher, anthropologist, and sociologist Bruno Latour's (1947-2022) position in *We Have Never Been Modern* (1993). Keel implicitly casts doubt on what is commonly seen as secular modernity due to disenchantment, but instead frames it as the result of—a critical term for this project—"reoccupation." Keel's book, while a work of science history, uses the philosophy of Blumenberg—specifically his term "reoccupation"—as an analytic tool to reveal a profound and broadly applicable claim that Blumenberg advanced in his *Work on Myth* ([1979] 1988). Keel's book, then, is a clear and demonstrable example of a concept I wish to 'occupy' and is directly compatible with my analysis, as not only is it about the relationship between science and religion in the secular modernity of the Western North Atlantic (though Keel uses race as his access point to extrapolate how secular modernity is false), but that there is a falseness of secular modernity through the psycho-historical configuration of the reoccupation of myth.

Given the text's brevity, Keel divides the book into five chapters, each set in a different frame of space and time. While the first chapter takes place in eighteenth-century Germany, the rest of the chapters are located primarily in the United States, spanning from the nineteenth to the twenty-first centuries. This already alludes to the scope of Keel's book, and this may present a point of criticism to the text from some, as there is little room in the

146 pages to bring much detail to his arguments. However, this criticism by no means diminishes the book's insightful contribution to the field of science and religion for two main reasons. The first and most politically poignant aspect is that this work presents one of the first accounts of race situated adequately within what I have been calling here science and religion studies, rather than approached solely from sociological, anthropological, or biological perspectives.[31] Second, and importantly for my purposes here, is the way in which it falls under the auspices of both secular studies and narrative studies. Keel's work takes Weber's disenchantment thesis and subverts it by showing how Christian theology persists in modernity through the very ideas of race we hold, which are so prevalent today.

Keel discusses Weber's disenchantment thesis, writing,

> were one to scan scholarly literature…one would find that Max Weber's account of secularization—understood as a modern disenchantment with the Christian worldview and a division of labor between religious and nonreligious institutions—has implicitly shaped how the history of racial science has been told (2018: 14).

Disenchantment, however, has taken on mythic qualities in its portrayal of the present circumstances. The popularity and longevity of this myth lie in the intuitive appeal of the perceived schism between the mysterious, spiritual world of our past and the rational,

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[31] It should be noted that Sylvia Wynter's extensive body of work has long theorized the entanglement of secularism, race, and science, particularly through her genealogy of "Man" as a secularized overrepresentation of the human that replaces theological with biocentric modes of exclusion. See especially Sylvia Wynter, "Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation—An Argument," *CR: The New Centennial Review* 3, no. 3 (2003): 257–337; and "1492: A New World View," in *Race, Discourse, and the Origin of the Americas: A New World View*, ed. Vera Lawrence Hyatt and Rex Nettleford (Washington: Smithsonian Institution Press, 1995), 5–57. However, Wynter's interventions emerge from Caribbean philosophical anthropology, critical theory, and Black studies rather than from within the institutional field of science-and-religion studies as typically constituted. Indeed, the sustained scholarly engagement with religion in Wynter's corpus has only recently been undertaken; see Justine Bakker and David Kline, eds., *Words Made Flesh: Sylvia Wynter and Religion* (New York: Fordham University Press, 2025); and Benjamin G. Robinson, "Racialization and Modern Religion: Sylvia Wynter, Black Feminist Theory, and Critical Genealogies of Religion," *Critical Research on Religion* 7, no. 3 (2019): 257–274. Keel's contribution is thus distinctive not in being the first to draw these connections *per se*, but in situating them explicitly within the disciplinary apparatus of science and religion studies.

calculable world of scientific modernity. However, Keel proposes a new approach to secularization. Instead of a "rupture from the past" (2018: 15), Keel offers a conception of secularization that is "a transference of religious forms into nonreligious spaces of thought and practice" (2018: 15). Keel believes this would require that we extend our thinking about both the tools which scientists use to answer questions and the questions which are inherited by less (or un)definably clear beginnings and/or ends. In doing so, Keel invokes Michel Foucault's "myth of pure origins" from his essay "Nietzsche, Genealogy, History" (2018: 31). This myth subverts the thinking that ideas are 'purest' at their origins and have definable beginnings. Instead, Foucault claims that things in the world (whether ideas, social structures, intellectual property, etc.) do not have clearly defined beginnings but are much more deeply embedded in human collective culture. For example, the flood narrative of Noah's Ark was not created exclusively for the biblical text, but was adopted and adapted from many existing flood narratives, such as the Mesopotamian flood myth in the *Epic of Gilgamesh*, which likely dates back to much earlier times.

To make sense of this notion of secularization as questions and tools inherited, Keel offers the term "reoccupation" from Hans Blumenberg. Reoccupation is used to refer to "the reoccupation of answer positions that had become vacant and whose corresponding questions could not be eliminated" (Keel 2018: 15). The reoccupation of answer positions means, in other words, that long-lived, existential questions, questions for which answers are likely never definitively answerable, are susceptible to new answers that reflect the temporal, cultural, and epistemic realities of the time. Bringing back historical distance, the spectrum of dimensions to be considered when reflecting on the past is a motivating factor for the reoccupation of answer positions. In yet other words, vital for our considerations for this project, the reoccupation of answer positions related to seemingly eternal metaphysical questions, like "Where do we come from," "Is there meaning to the universe" and "How am I

to live," are not devoid of debt to Christian thinking but are in fact deeply indebted to it, maintaining a lineage of intellectual and cultural transmission—what we might, following Dawkins (1976), call a kind of memetic inheritance—through generations of human contributions in their present towards those answer positions of the past. By 'memetics' here, I simply refer to the mechanisms by which ideas, values, and conceptual frameworks are replicated and adapted across cultural contexts, analogous to, but distinct from, genetic inheritance.

An example Keel uses to illustrate this clearly is the eighteenth-century German comparative anatomist Johann Friedrich Blumenbach. Blumenbach was a "product of the Enlightenment" (2018: 23) who carefully separated his religious views from his scientific investigations. However, Keel reveals how Blumenbach was, in fact, deeply indebted to Lutheran Christian theology; for example, Blumenbach's *bildungstrieb*, the mechanism Blumenbach used to account for species variation, was a 'reoccupation' of the "creative powers of the God in the Genesis narrative" (2018: 24). The reoccupation of answer positions is again shown by Blumenbach in his account of the origin of the races. Given the social and temporal context of Lutheran Germany, Blumenbach asserted that the different races were descended from a single source—the white Caucasian. Keel argues that this common ancestry was a reoccupation of the story of Eden and the first human, Adam. In accounting for the first human as having the features, such as the skull, which is "most beautiful" (Keel 2018: 29), Blumenbach's science took on a "mongrel"-like explanation, one that was "a hybrid of biblical creationism and a secular account of life's origins" (Keel 2018: 28). Blumenbach's reconceptualization of nature further alludes to this; Keel writes: "This reconceptualization of nature as dynamic and life producing—rather than static and inert—annexed the power of creation from God and made it an attribute of nature. Nature in effect was divinized" (2018: 27).

This example reveals what Keel is directing the reader towards. In Keel's understanding, Blumenberg means "that modern thinkers have fashioned new concepts and ideas to answer questions inherited from Christian intellectual history" (Keel 2018: 15). While Blumenbach was situated within the context of Enlightenment values, so much so that intellectual historian Reginald Horsman wrote of Blumenbach that he was "influential in taking the study of mankind out of the realm of theologians and in making it a matter of physical comparison" (Keel 2018: 30), Keel undermines such a claim and instead redirects our attention to a more genealogical process of intellectual history that shows the debt that Blumenbach has to Christian ideas of origin and race. While some historians claim that Blumenbach is a powerful example of Enlightenment values taking root in scientific investigation, Keel's work shows that Blumenbach is indebted to Christian thought. This is again demonstrated when Keel indicates that Luther's writings on the Bible are mirrored by Blumenbach's writings on human descent.

As one of the oldest and most foundational narratives of the West, Christianity has been the source of answers to questions arising from and through the world. Foucault's thinking in this text points to the way in which knowledge does not originate by spontaneous genesis but 'evolves' through gradual development into ever more deeply embedded positions within the socio-cultural psyche. In this way, Keel appears to be evoking the work of Friedrich Nietzsche, Carl Jung, and Jordan Peterson in claims that our interactions with, and thoughts about, the world are inherited, forming a genealogy that extends back to the origins of culture itself, if not further. Reoccupation, then, is the way in which answers to questions become disentangled from their previous answers and are instead inherited by another, newer grouping of answer positions; these will be causally related to the unique matrix of psychophysical properties of a given frame of time. In other words, the answers offered today owe a "cultural debt" to the intellectual history of the past.

Keel's work directly challenges the claims of secular modernity, as he writes that "the race concept in science forces us to recognize how Christian intellectual history sits with us despite our claims to being secular, rational, and modern" (2018: 145). As Blumenbach's example showed, even though one can be culturally situated within a period of rational and intellectual thinking, as Keel presented, one is still culturally indebted to the Christian theology of Lutheran Germany. Even in nineteenth-century America, when science became increasingly modernized and thereby secularized, ethnologists were reoccupying old answer positions on the origin of human races.

Keel introduces Josiah Clark Nott (1804-1873) and Samuel Morton (1799-1851). Nott was the most secular of the two, with Keel claiming that Nott was "one of the first American naturalists to publicly declare that modern science and the Bible were at odds concerning the study of race," engaging in public discussions that disenfranchised religion (2018: 57). As an ethnologist, Nott believed that polygenesis offered the best explanation for the origins of the races. In this view, "each of the races was formed within climates and environments where it was properly suited to thrive" (Keel 2018: 67). This, Keel explains, means that nature was, in effect, divinized, giving genesis-like power to nature itself, as Nott believed that nature granted order and purpose to the lifeforms it produced.

Nott was influenced by Morton, who, like many of his time, was a Christian who believed his science revealed God's work, holding that each race was specific to its environment, as per God's design. Instead of invoking God, Nott took this idea and "collapsed God and nature…believing that the organic world possessed the capacity to govern the physical constitution of living things" (Keel 2018: 69). Keel asserts that Nott evoked the same static and purposive principles as the theologian John Ray (1628-1705), in that for Nott "human differences were governed by an order where nature served as God's surrogate" (2018: 71). The result of the collapse of God into nature and its effect on many

American politicians was an inclination towards pro-slavery polygenists who believed that blacks were inferior to whites (Keel 2018: 75). This reoccupation of once-Christian answers by the new secular-scientific ones presented the South with the narrative necessary to justify their enslavement and treatment of blacks. In this way, Keel argues, the polygenists were the "link" between old ideas of Christians versus non-Christians, which was reoccupied as whites versus blacks in the United States.

Again, Keel demonstrates how religious forms enter nonreligious spaces and ways of thinking, but notes that this process does not occur in isolation. This is a natural disposition of the human mind and, therefore, a condition of our human nature. In *The Court Society* ([1969] 1983), Norbert Elias (1897-1990), a German sociologist, analyzed the court of Henri IV to argue that it was instrumental in constructing the courts of King Louis XIV-XVI. Careful not to claim that the courts of the Louis dynasty had a specific origin, Elias shows that "not one particular moment, or one particular individual, is the cause of history" (Nairn 2019: 67). Critically, Elias writes, "the sequences denoted by terms such as 'biological evolution,' 'social development,' and 'history' form three distinct but inseparable layers in a process encompassing the whole of [humanity]" (1983: 15). Because of the interconnectedness of these three layers, the reoccupation and cultural indebtedness that Keel is writing about are naturally occurring consequences of our evolutionary history in that mind, as a consequence of biological evolution, is responsible for both social development and history. Therefore, the mind pulls from the available knowledge pool, which happens to be bound to the long history of the social and intellectual milieu.

Thus, the two critical terms from Blumenberg that I have drawn out using Keel's text—reoccupation and indebtedness—are tools for conceptualizing how human beings, and cultures more generally, draw information from the figurations, or collective cultures/social pools, of their psychophysical and sociotemporal milieu. What seems to arise spontaneously

is indebted to the past. What appears to remove the answers from previous ways of knowing, in fact, holds onto those previously accepted answers. The embeddedness of one's position within a frame of time and a specific cultural context impacts the types of answer positions one can make. Answer positions are thus finitely conceivable, and this is why reoccupation and indebtedness are potent tools for assessing secular modernity and considering how myths retain their power in the present.

Reoccupation and indebtedness are even seen today in the sequencing of the human genome. Keel introduces the Neanderthal Genome Project (NGP), reiterating that the division of race into distinct categories was inherited from a Christian intellectual history beginning with Blumenbach. The concept of human relatability to previous hominids stems from the discovery of humanoid fossil remains in the nineteenth and twentieth centuries, which began to fill gaps in Darwin's *Descent of Man and Selection in Relation to Sex* (1871). The discovery of human ancestral remains and the subsequent arrangement of the fossils into genealogy was "an extension of the Christian view that life progresses toward higher forms of truth," Keel argues (2018: 124). Thus, the discovery of these fossilized hominid ancestors influenced humanity's understanding of itself as designed by a "creative force capable of forming species with specific traits, and the belief that human history was marching toward predetermined ends" (Keel 2018: 128). When scientists at the NGP began testing living humans in 2006 to see how much DNA was shared with Neanderthals, Keel argues that they employed the same divisive thinking Blumenbach had reappropriated from theological explanations.

If the reoccupation of secular answer positions is indebted to and shares similar traits with Christian theological answer positions, then recall that in Chapter Three, I put forth that the disenchantment thesis of Weber still rings true for many and that its use-value has not yet expired. The reoccupation of human origins and race by secular-scientific understandings of

what it means to be human or be a certain race demonstrates how the rationalization and intellectualization Weber alluded to are indeed occurring. However, as Bruno Latour points out in *We Have Never Been Modern* (1993), "the less moderns think they are blended, the more they blend" (43). In other words, the more we continue to think that we are divided by the schism that disenchantment claimed to have created, falling ever more deeply into rational and intellectual thinking, the more we become pulled into the centre position of the schism. I believe this is what Keel has shown. By using even more precise scientific descriptions and investigative methods, the individuals in Keel's book attempted to distance themselves from thinking of themselves as pre-modern or un-secularized, and to find answers more aligned with nature. However, the answers they offered were indebted to the very thing they were attempting to subtract from their answers—theology. In this way, we have never been modern, and the structural conditions of disenchantment persist even as the answer positions themselves are perpetually reoccupied.

Keel denies Ronald Numbers' claim that methodological naturalism during the nineteenth century marked the end of the influence of theologies over scientific thought (2018: 143). As I hope to have shown, Keel demonstrates the critical importance of considering how the metaphysical aspects of myth reveal the vital role of narrative at the intersection of science and religion. My introduction to Blumenberg through Keel also revealed the impact of the sociotemporal-psychophysical milieu on understanding and interacting with the world, highlighting how Christian theology has influenced what is claimed to be modern secular Western North Atlantic thinking. The reoccupation of answer positions is a critical tool for us to think through the reoccupation of Christian answer positions with secular-scientific ones for the Grand Cosmic Narrative.

Blumenberg formulated the reoccupation thesis to explain a specific macro-historical transition: the emergence of modern self-assertion in response to the collapse of late-

medieval theological absolutism. My application of the concept to a 1980 television programme might therefore appear anachronistic. However, the analytical structure of reoccupation—the persistence of answer-positions whose theological content is replaced by new content while the structural demand for answers endures—is not bound to any single historical transition. Keel's own application of the concept to 18th-century racial science, 19th-century polygenism, and the 21st-century Neanderthal Genome Project demonstrates that the mechanism operates across scales and periods. What I retain from Blumenberg is the structural principle, and what I adapt is the site of application, extending it to a media text that, as the content analyses will show, demonstrably fills theological answer-positions with naturalistic content. This is an adaptation of Blumenberg, not a strict application, and the adaptation I claim is justified by the analytical work it performs.

Keel's work demonstrates the versatility and importance of Blumenberg's work. It also reveals the intricate way in which narrative and time play are crucial factors in the establishment of myth. Blumenberg himself was well aware of these concepts and wrote in response to the secularization claims being made around him during the 1960s and 1970s, especially by those in the Frankfurt School's tradition of critical theory (Bajohr, Fuchs, and Kroll 2020). He did so because he felt the conversation was not sufficiently reasonable, failing to consider the importance of myth and to account for the prognosis of secularization. Blumenberg's seminal work, *Work on Myth* ("*Arbeit am Mythos*", 1979), challenged the traditional view of myths as primitive or outdated narratives superseded by scientific understanding, arguing that myths continue to play a fundamental role in human existence. He saw them as essential mechanisms by which humanity makes sense of the world, confronts the unknown, and manages existential anxieties. Myth serves as a means to navigate the "absolutism of reality" (Blumenberg [1979] 1988: 3),[32] a term Blumenberg used

[32] Further reference to this book will only source the 1985 translation by Robert M Wallace.

to describe the overwhelming and incomprehensible nature of reality that confronts human existence. In his view, myths offer a way to mediate the confrontation with the unknown (chaos, in Peterson's terms), providing narratives that allow individuals and societies to cope with the uncertainties and existential threats of life. They do not merely represent escapism or falsehood; instead, they are integral to the construction of human culture and the development of human knowledge.

Blumenberg's philosophy of myth examines the role of human culture and the narratives it encompasses as an enduring and necessary aspect of human life. In response to the Frankfurt School, Blumenberg argued that myths are not static relics of the past but rather dynamic, evolving narratives that adapt to society's changing needs and challenges. Myths work by offering narratives that provide continual, renewing meaning, orienting space and time in ways that account for present considerations of rational discourse. Myths have "something to offer that—even with reduced claims to reliability, certainty, faith, realism, and intersubjectivity—still constitutes satisfaction of intelligent expectations" (Blumenberg 1988: 67). That "something," the thing that provides continued relevance for myth even in the face of reducing claims, is "significance." Like the definition of myth near the beginning of this section, Blumenberg points out that significance "is one of the concepts that can be explained but cannot, in the strict sense, be defined" (1988: 68). Still, he offers some helpful explanations through two mechanisms.

The first mechanism is "generated not only by intensification but also by power depletion" (Blumenberg 1988:75). This first mechanism is exemplified by the example of Johann Wolfgang von Goethe (1749-1832) and the "necklace affair" of 1785. Without delving into the details of the affair, the first mechanism suggests that myth is not merely structural in the sense that the core narrative elements remain, but that their central information changes. Myth is also functional, as it serves as a means of relaying important

information that has, and can, contribute to human survival. Myth, then, cannot be eliminated from the human experience by means of rationality or calculability, or as Pini Ifergan writes, by its "conceptuality, but also in terms of its content" (2023:1245). The power of a myth is transmitted from one generation to the next as its meanings and reasons evolve in response to the epistemic conditions of the time. The myth intensifies its value and adoption as the changes become more widely accepted. This, in turn, depletes the power of the old myth. However, running through this change is the "core" of the myth—the elements that make it discernible and thus traceable genealogically. This is what is significant for the reasons mentioned above, namely, meaning and orientation.

The second mechanism "arises as a result of the representation of the relationship between the resistance that reality opposes to life and the summoning of energy that enables one to measure up to it" (Blumenberg 1988: 75). This gets at the practical, lived elements of myth, the stuff of story that tells of heroes and villains, worlds and legends. Using Odysseus as an example, Blumenberg argues that it is not only a story of a great hero and his challenges, but a means from which to derive the content of what it means to be noble, brave, and strong. I borrow Joseph Campbell's terms to exemplify this: the hero's journey's conclusion, returning home victorious, is the only act of mythic endorsement. However, the complete narrative encompasses the challenges he faced during the siege of Troy or the battle against the Cyclops, for example. It is to return and be challenged, mirroring life in the literal and figurative, that derives meaning from the resistances one may face and challenges one to live up to those remembered for their perseverance and renown. Myth, then, is representative of identity. It is the backbone of one's orientation to challenge; it is a call for home when the challenges are overcome.

Both of these mechanisms clarify the general definition of myth from above: myths are stories about something significant that are held tenaciously by adherents. The first offers

us clarity: the stories of myths are susceptible to change, do indeed change, and will continue to change. This, I suggest, is critical to the adherents' tenacious hold on the myth. If a myth no longer holds relevance to today's problems, it will lose its power. It will only be intensified when the story is invigorated by the needs of the people. The second mechanism assists us by revealing how resistances are overcome and the way in which those challenges are steps along the path towards reconciliation with one's place in the world and at home. This, in effect, intensifies the adherent's view of home as meaningful, or in some cases, powerful, and worth being a part of. This can be expressed in the exceptionalism that many developed nations, such as America, Canada, Russia, and China, undoubtedly reinforce, along with the idea of nationhood each has. With respect to the Grand Cosmic Narrative, we are educated to view Earth as our home, as worthwhile, and as worth preserving and cherishing; part of a larger ecological and cosmological orientation.

One aspect of Blumenberg's thought that I find interesting about his philosophy on myth is that it reveals his influence from the context in which he found himself, specifically, the changing nature of the social sciences in the 1970s, in the aftermath of the New Synthesis's broad adoption in the 1930s and 40s (Alexander 1974), especially in Germany at the time. Angus Nicholls, Professor of Comparative Literature and German at Queen Mary University London, argues in his 2015 book, *Myth and the Human Sciences: Hans Blumenberg's Theory of Myth*, that Blumenberg's work is informed by the final question of Kant, "What is man?" ("*Was ist der Mensch?"*) (Kant 1800), which becomes one of the central questions of anthropology of the 19th and 20th centuries. This question, Nicholls proposes, informs Blumenberg's philosophy and binds it to it. German social theorists and philosophers, such as Alsberg, Gehlen, and Heidegger, were challenged by this question, and Blumenberg was no exception. *Work on Myth* was Blumenberg's confrontation with the problem of "what is man" in light of advances in evolutionary, social and biological sciences.

So, Blumenberg is helpful to us for two important reasons. As introduced by Keel, the first is reoccupation, which provides a method and linguistic mechanism for thinking through the changes that occur to narratives—and later to myths—across time and space. The similarities between Judaism and Christianity are partly due to the reoccupation mechanism in adopting previously held belief and knowledge structures to the new realities brought on by Roman imperial rule and the long history of displacement of the Jewish people. Alternatively, we could consider science within the Grand Cosmic Narrative, as presented in *Cosmos*, which addresses the question that preoccupied Blumenberg when writing *Work on Myth*. The narrative of Creation, a myth of universal appeal and many expressions, is retold using similar thematic and linguistic elements, and I will return to this again in force in the concluding chapter. The second is that Blumenberg offers a richer understanding of myth and its role in both macro and micro contexts. Myth is vital to communities, as it shapes their ideals and character through the narratives they tell. Myth is essential for the individual as well, as those narratives provide context, place, and a sense of belonging. Myth, and its continuation through reoccupation, is the glue that binds people and communities together on a large scale over large amounts of time.

Lastly, before moving on, I want to briefly bring in the work of British philosopher Mary Midgley (1919–2018). In *Science as Salvation: A Modern Myth and Its Meaning* (1992), based on her Gifford Lectures, and *The Myths We Live By* (2004), Midgley extensively critiqued the myth-like status that science has acquired in modern culture—its position as unquestioned and absolute—and the cultural and ethical implications of such narratives. Midgley defines myths not as simple falsehoods but as powerful narratives that underpin and influence societal beliefs and actions, the “patterns that we follow at a deep level” (1992: 1). Myths are “not lies. Nor are they detached stories. They are imaginative

patterns, networks of powerful symbols that suggest particular ways of interpreting the world. They shape [the world's] meaning" (Midgley 2004: 1).

Midgley argues that we ought to be critical of science as having the answers to all problems, and as a replacement for those "spiritual, moral, metaphysical, or psychological" endeavours in other fields of inquiry (1992: 56). Midgley challenges the myth of scientism, arguing that science often assumes the role of a secular religion, promising salvation and answers beyond its reasonable scope in what she calls "reductive megalomania" (Midgely 2004: 46). Scientism can obscure necessary ethical considerations, positioning science and technology as the ultimate authorities on human and societal advancement. Both of Midgley's works emphasize the impact of uncritically accepted myths, like scientism, on public policy, ethical decision-making, and the consequences for daily life, as myths are "the matrix of thought, the background that shapes our mental habits" (2004: 5). She warns that when society uncritically embraces such myths, it risks ignoring the more profound ethical, philosophical, and social implications, those aspects I argue which lie at the core of the GCN. For example, she is adamant that physicists and astronomers, in their belief in the "Strong Anthropic Principle," use this position to make claims that, when taken as a whole, render the "earth and its fauna more or less obsolete and expendable" (Midgley 2004: 176).

However, Midgley champions a reflective approach to understanding the myths surrounding science. She does not argue that science has no role in shaping myth, nor does she argue that science should be dissuaded from engaging with mythic elements. She urges reevaluating how these myths influence our values and priorities, particularly in environmental ethics, public health, and global welfare. Her call for a multidisciplinary dialogue reflects her belief in integrating ethical and philosophical perspectives into scientific discourse. For example, Midgley quite adamantly argued that James Lovelock and Lynn Margulis' Gaia Theory is a critical metaphor for addressing the impending climate crisis, as it

allows for blending science and spirituality in a forward-looking and vital way that builds a new matrix of symbols and myths (2001). We must, she contends, "become aware of these symbols" so as not to uncritically accept those myths that operate implicitly, unexamined, and are often mistaken for objective truths (Midgley 2004: 3).

In this way, I argue that *Cosmos* and Midgley are closely aligned in their aims. In following Midgley's argument, the grand narrative of *Cosmos*—the GCN—becomes a critically accepted myth, held with awareness of its status as provisional, open to revision and comparison with alternative perspectives. The critical stance, Midgley claims, allows myths to function as useful conceptual tools rather than rigid dogmas, enabling a more balanced and adaptable worldview (2004: 60). Midgley claims that the danger lies not in possessing myths, which are inevitable, but in forgetting that they are myths, thereby losing the capacity to question and refine them. While *Cosmos* and the Grand Cosmic Narrative may be only about science at first glance, that would be simple and misleading. Cosmos argues that skepticism is an essential component of science and that dogmatism is antithetical to its advancement. *Cosmos* encourages critical thinking—"scientific thinking"—so that together we can overcome today's and tomorrow's challenges. *Cosmos* is not only about space, galaxies, and the universe, but also much more local; it is about Earth, it is about life, it is about our connection to the Cosmos, and it is about respect for all and the ways we approach understanding those things. Through these means, the Grand Cosmic Narrative builds a mythic quality. It formulates a moral framework, creating a world-building approach to confronting life and its challenges, and it asks us to reconcile with the life we share with all the species that call Earth home.

This section has aimed to reveal the powerful mechanisms that narratives employ in soft-world-building: the metaphysical elements that shape a person, place, and time. For a Grand Cosmic Narrative like that of *Cosmos,* the narrative woven from science and world

history builds a complete framework for experiencing, confronting, and living in the world. Much as Abbott's (2014) second description of narrative, *Cosmos* is "loose and generally recognizable"(14) in its form and function. We have seen it before; it has been present for millennia in one form or another. These powerful and familiar narrative tropes are, according to Hans Blumenberg, "reoccupied", transferred from one answer position to newer ones as the cultural milieu changes through space and time. Narratives change, adapting to new knowledge and circumstances as humanity culturally evolves. This cyclical cycle, or reoccupation, informs Bruner's two theses on the nature of narrative as a means of personal orientation in the world and as a mechanism for cultural transmission about the world. The GCN, as revealed through *Cosmos*, provides audiences with orientation by offering a skeptical and inquisitive stance towards the world, one that is open to knowledge production rather than maintenance or adherence. It also attempts to bring the world's cultures together by revealing the many ways that humans have developed unique expressions of their ancestry, creating a cultural heritage that is itself a unique expression of the human experience. The narrative of *Cosmos* reoccupies myth, but from the grounded empirical stance of the academic enterprise.

Affect

So stories, narratives, and myths, all intermingling through different mechanisms, strengths, meanings, and virtues, are connected to communities and have been for, as far as we know, as long as *homo sapiens* have been *homo sapiens*. We have examined the narrative and its importance in our daily lives. We have also examined the myth and its role in creating worlds and meanings. We examined how narrative meanings retain a familiar core structure, while their presentation and the details of their stories change over time in response to historical

and cultural values. Here, I believe Ludwig Wittgenstein's concept of "family resemblance" is an apt philosophical mechanism for understanding the hermeneutics of narrative within Blumenberg's cyclical view. Wittgenstein writes that a family resemblance is a network of overlapping, or "threaded", similarities among things grouped under a concept, rather than a single feature or set of features common to all (Wittgenstein [1953] 2009: 36). This means that members of a category—like games or family members—may resemble each other in different ways, but no single characteristic is shared among them. Instead, their strength of relation "resides not in the fact that some one fibre runs through its whole length, but in the overlapping of many fibres" (ibid.). Wittgenstein illustrates this by noting that within families there may be similarities in build, eye colour, temperament, and so on, but not all traits are shared by everyone (ibid). Similarly, linguistic categories are connected not by strict boundaries but by a flexible structure of relatedness, and he uses his famous game example to demonstrate this. It is worth clarifying that by invoking the language of "grand narrative" here, I do not mean what Lyotard (1984) means by *grand récit*—a legitimating metanarrative that operates above and unifies smaller-scale narratives into a totalizing epistemological framework. Rather, I am describing a functional capacity: myths, through processes of cultural embedding, institutionalization, and normalization over time, can come to occupy the same structural role that Lyotard attributes to metanarratives—namely, providing the world-building, meaning-making frameworks within which smaller, smaller-scale narratives become intelligible. The individual myth of Oedipus is not, on its own, a grand narrative in relation to Antigone, but the mythological cosmology within which both are situated arguably functions as one. It is in this functional sense that myths share a family resemblance with grand narratives: not as identical categories, but as overlapping networks of world-building, legitimation, and cultural authority whose fibres, to use Wittgenstein's image, run alongside and across one another without any single thread extending the whole length. From this point

forward, I will use the term ‘narrative’ only, unless I need to signal the larger, world-building and institutional aspects of myth, in which case I will specify and use the term ‘myth.’

The family resemblance of the Grand Cosmic Narrative is evident in both its relationship to other grand narratives of science and to the Creation myths of many world religions. As we have seen in the last sections of each chapter, especially this one, the GCN framework—that the world is knowable and that knowledge, in turn, ultimately makes the world better—is a crucial factor connecting these threads. Moreover, and more obviously, the detailing of a systematic, step-by-step account of the universe’s origins and the world, as well as our own existence, bears a significant resemblance—one that is most often at odds with any form of biblical literalism and/or Christian fundamentalism. The GCN, through Cosmos, maintains the core narrative shape and meaning-making aspects of traditional myths while adapting the story’s details to fit within the present scientific context of that enterprise. Furthermore, by incorporating the narrative with Hollywood-calibre visual effects and soundtracks, the GCN retains its mythic power through a full sweep of reoccupation.

One thing remains in our explorations in this chapter relating to narrative that we must contend with: grappling with the subjective engagement and the emotional aspects that arise from confronting narrative. Stories have long provided meaning, affecting individuals in profound and subtle ways. Yet, the study of affect, the so-called ‘affect turn,’ has really only been, at least in the humanities and social sciences, a product of the post-modern era emerging with the new millennium and has produced a substantial body of literature, such as Ahmed (2004), Clough et al. (2007), Massumi (2002), and Thrift (2008), among others (Blackman and Venn 2010). This was the result of several developments across the spectrum of scholarship, each dealing with the importance of subjective-objective relations, like the social and the natural, the mind and body, the cognitive and affective (Blackman and Venn 2010: 7). This mixing of once-considered separate realms has placed great emphasis on the

body. As such, ‘body-studies’ has become an active and growing area of research for academics focusing on affect.

The body is central to affect for two main reasons. The first is that the body is part of the dualism that has long influenced Western continental philosophical thought. Beginning with René Descartes’ (1596-1650) substance dualism that divided the mind from the body, much work across disciplines and fields in philosophy and broader ‘studies’ areas has emphasized the distinctness between the body, as an object of nature, and the mind as a thing of emergent and transcendent properties. Interestingly, the mind is often synonymous with the soul. Although the dualism between mind and body was formalized in 1641, and possibly earlier, the concept of ghosts, spirits, and similar supernatural beings nearly always depicts the spirit with the same body it had in life. This brings into consideration the anthropomorphization of natural elements into humanoid form via the gods of old, and the duality (if any) at play in thinking about mind and body. But over centuries of philosophical and natural-philosophical thinking and experimentation, Cartesian Dualism became a paradigm of rational thought. But this has begun to change, and Affect Studies is one area where that becomes apparent.

The second reason, which is closely tied to the first, is simply that the body is the externality of the self in the world; it is the acting, moving, physical object that occupies physical space and changes physically through time. My mind reacts when I see something happen in the world—say, a car blowing through a red traffic light—but my body responds, too. Sometimes, my body reacts, then my mind reacts, and vice versa. This brings us to another critical term in Affect Studies: embodiment. Arising from various disciplinary contributions, such as cognitive science, philosophy, psychology, and others, it is closely related to affect. Embodiment sees “our bodies both as physical structures and as lived, experiential structures—in short, as both ‘outer’ and ‘inner’, biological and

phenomenological. These two aspects of embodiment are obviously not mutually exclusive. Instead, we continuously circulate back and forth between them" (Varela, Rosch, Thompson 1991: xv).

This gets at one of the central aspects of affect theory: its emphasis on pre-cognitive bodily processes that operate prior to conscious awareness and linguistic articulation. Brian Massumi's foundational work conceptualizes affect as "intensity," describing it as embodied in "purely autonomic reactions most directly manifested in the skin" and existing as a "nonconscious, never-to-be-conscious autonomic remainder" that operates outside expectation, adaptation, and narrative sequencing (Massumi 1995: 85-90). Drawing on extensive empirical research, Massumi argues that cognitive processing involves a half-second delay during which autonomic bodily responses have already begun, demonstrating that affect functions independently of and prior to conscious thought (Massumi 1995). Nigel Thrift's non-representational theory similarly valorizes "those processes that operate before...conscious, reflective thought," attending to what he describes of how a "rolling mass of nerve volleys prepare the body for action in such a way that intentions or decisions are made before the conscious self is even aware of them" (Thrift 2007: 7). Collectively, these theorists shift analytical attention away from representation, signification, and subjective interiority toward the immediate, ephemeral, and sub-personal dimensions of embodied experience.

Affect, revolting against the mind-body dualism that has been part of the Academy for centuries, is about bodies and experiences within and of the world. It is not only emotions, though these are certainly a part, but also form—the specific, complex, and sensitive elements of texts (broadly defined) that reveal similarity and/or sites of resonance, whether intentional or not (Brinkema 2014: 33). Eugenie Brinkema, Professor of Literature and Media at MIT, focuses her work on affects to what she refers to as 'form', for example, the tear drop

running down the nose-bridge of Marion Crane (played by Janet Leigh) in Alfred Hitchcock's *Psycho* (1960), which also graces the book's cover. The form in Brinkema's work calls back to the Platonic ideal of the form, the prototypical exemplar of a thing. It is affectual in its reach, the knowing of what it is, even if we don't have the language to describe it. Affects are, to make Brinkema's case simple, inspired not only by feeling and interiority, but also by the objects in the world, such as tears.

Affects are also, according to Donovan Schaefer, Associate Professor of Religious Studies at the University of Pennsylvania, "the flexible architecture of our animal lifeways" (2015: 24). Here, Schaefer refers to the biological sources of our reactions to the world, as the arrangements and rearrangements of how bodies move and interact in space and time. Schaefer aims to deprovincialize religion as a human quality of language and thought by focusing instead on affects, feelings, and emotions—experiences that are part of the animal kingdom. As he argues, an explanation may not have come first, but instead the feeling (Schaefer 2014: 9). Religion, Schaefer argues, is "best understood neither as exclusively cognitive nor as exclusively human" (2014: 6). Instead, religion may be best understood as the "way things feel, the things we want, the way our bodies are guided through thickly textured, magnetized worlds" (Schaefer 2014: 3). In taking religion not as a human trait but as an animal (to which humans belong) trait, Schaefer "overturns the sentence of solitary confinement imposed on human bodies by our own anthropocentric presuppositions, returning us to other bodies on and in the earth" (2014: 211).

Affects, for Schaefer, are also how the body's actions and mind's words intermingle "by considering the interaction between the landscape of feeling bodies and the affect charge of words themselves" (2022: 63). Words work because of affects. According to Schaefer, this type of affect theory posits that knowledge feels and that "feeling is the foundation of our embodied lives" (2022: 59). This includes knowledge, as it has an embodied, felt affect. And

science, for Schaefer, is an embodied, affective practice. Schaefer presents one of the most exciting and compelling arguments, challenging the conventional dichotomy between reason and emotion by positing that our engagement with the world is profoundly rooted in the affective dimension of experience. Schaefer's 2022 award-winning book, *Wild Experiment: Feeling Science and Secularism after Darwin,* achieves this by weaving a complex intersection between religious studies, philosophy, philosophy of science, neuroscience, and affect theory to destabilize the secular position that privileges rationalism over other forms of knowing and feeling. This is the post-secular condition I defined in Chapter One via the hybrid of Habermas and Taylor as secular reason as never neutral, religious affect as never fully privatized. Here, it is given a finer-grained mechanism through Schaefer's affect theory. Schaefer's work, therefore, is pivotal to this project, as it provides a recent and rich study on the nuanced interplay between science, religion, secularism, and affect, all of which play roles in the formation and success of the Grand Cosmic Narrative.

Central to Schaefer's thesis is that the affective turn in the humanities and social sciences offers a critical lens for reevaluating scientific and secular narratives shaped in the wake of Darwin. Schaefer emphasizes that emotions and feelings—affects—are foundational to human experience, building on his 2015 work on affect in *Religious Affects: Animality, Evolution, and Power*. Here, though, he presents what he is calling "cogency theory," which Schaefer writes is "knowledge making…as defined by pleasure" (2022: 4). Cogency is the "network of tastes, dispositions, and moods laying down the rhythm that enables our memories, ideas, concepts, and beliefs" (ibid). In developing this position, *Wild Experiment's* first ("small") argument is built to challenge the boundaries between emotion and reason, the myth that reason is king and emotion and feeling have no place in science—the view of scientific rationality. Knowledge from science or religion *feels true,* Schaefer argues, because

it fits into, or "clicks" is the term he uses, into our existing structures of belief and understanding.

Schaefer's second argument (the "big" one) is that if thinking feels, then feeling is what enables reason to work. But feeling also leaves thinking susceptible, open to the spectrum of emotions that move with and surround it. This spectrum may induce "self-interest, prejudice, or confirmation bias" (Schaefer 2022: 8), as what feels right, what *clicks*, can lead one astray: what feels right is not equivalent to what *is* right. One of the primary objectives of Schaefer's work is to 'diagnose' misinformation and conspiracy surrounding science. Using the two arguments, one big and one small, Schaefer sets for himself the difficult task of building a theory of science motivated by feeling, and in so doing reveals why feeling can lead to misinformation that *feels right*, even if it is not.

Schaefer's aim places him at the crossroads of religious and secular worldviews, thinking and feeling, which is why Darwin is a fitting figure to highlight. Even though Darwin didn't write extensively about religion, according to Schaefer, or even care about questions related to religion, he is nonetheless a complex figure who revolutionized biology and contributed to a broader conversation about the nature of human understanding and emotion. Examining Darwin's extensive collection, particularly his 1872 work on emotions, *The Expression of the Emotions in Man and Animals*, provides Schaefer with the experimental and theoretical resources needed to show that Darwin himself was deeply invested in understanding the role of affect in the natural world. Schaefer contends that Darwin recognized the importance of emotional life in understanding human and animal behaviour, a perspective often overshadowed by his contributions to evolutionary biology. Darwin cogently popularized the idea that human beings are animals. He also, by inference, showed that the human brain, as the site of the mind, is an animal organ, an animal part. If the mind is an animal faculty, and feeling is too, then Darwin revealed a significant turning point

for thinking about the "mind…as constituted from the root up by feeling" (Schaefer 2022: 168).

This is a bold and intuitive claim. Science, as the domain of the rational and the unfeeling, being at the very core of the secular discussion in many cases, is theorized here as a feeling-driven enterprise. Instead of cold, hard facts, we have warm, glowing feelings. Instead of Darwin as the objective observer of the world, we have the excited and feeling-motivated explorer.[33] Our prior discussions have addressed the intersection of secularism with science and religion, and the importance of narrative for secularity; here, however, Schaefer connects affect with secularity, or specifically 'secular affects,' because "secular reason is not neutral. It comes along with a felt dimension. Emotions—including the felt aspect of knowledge-making—build secular bodies, secular cultures, and secular politics" (2022: 83). Secularization, and disenchantment too, are not eradications, but much in the same line as Taylor and Blumenberg, are viable replacements or rearrangements of one "template of feeling" for another (2022: 84).

Secularization and affect are co-creating. Science, one of the chief exemplars of the secular and disenchantment, looks to discovery and experiment for knowledge-making, but as Schaefer argues, science is "an ongoing *process*— a contest of forces— and specifically as a constant measuring and remeasuring of the *felt* weight of facts" (2022: 9). *Cosmos* uses music, visuals, and poetic language to evoke awe, wonder, and a sense of shared purpose, thereby making its grand narrative "feel right" and compelling to the audience, even for those skeptical of traditional religion. However, science and all the accompanying "intellectual passions" are wrapped up in secular values, requiring spatial separation between the secular and the religious, regardless of their shared heritage. Schaefer uses the relatively simple and

[33] This would no doubt be obvious in any history of science discussion of Darwin, as he was quite sensitive to the feelings of his family and friends. The most notable, and tragic, of these expressions was in the wake of his child's death in 1851, his sadness and worry for his wife, Emma.

compelling example of the University of Oxford, specifically the University Church of St Mary the Virgin, which has been present since at least 1086 and became the seat of the university's governing body, the convocations, by at least 1252. The changing landscape of university affairs from being a branch of the church enriching theological discourse with the Trivium and Quadrivium to being a unique institution that, while still organizationally similar, was detached from the Church in meaningful ways, like the adoption of new academic areas such as natural philosophy and medicine via Master of Arts degrees, was a crucial turning point for the secularization of the university, something that was repeated across nearly all ancient universities.

The learning offered by the church evolved into the teaching provided by the university, and the university fostered the conditions for inquiry that ultimately contributed to secular understandings of society and culture. While I am not claiming that universities were the only pathway to secular ideals, they were a particularly important one for promoting them. This is vital because the reoccupation of learning, from being oriented toward the transcendent of God to slowly, over generations, toward nature, is but one transition that Taylor alluded to. However, what is critical for us in this new discussion of affect is to consider just how central the role of feeling, that sense of 'rightness', was for these grand narratives of nature and how interconnected they are with the secular and disenchantment.

Feeling is absolutely essential to the Grand Cosmic Narrative. What Schaefer argues in his work can be extracted and applied to the education of science as a grand narrative. The Grand Cosmic Narrative has, I argue, begun to assume mythic status, at least among certain audiences, by shifting from science popularization and education towards a meaning-making framework that reoccupies the answer positions of past myths and stories. Whether this mythic function operates broadly across the culture or primarily among audiences already disposed to secular spirituality, the 'spiritual but not religious' demographic that now

constitutes a growing segment of the Western population, is a question that shall be taken up more directly in the chapters that follow.

Christianity is one of the most powerful narratives in the world and the predominant narrative in the Western North Atlantic. As Schaefer argues in *Religious Affects*, affects—feelings and emotions rooted in both the biological and the intellectual—are central to religion. The body moves and feels in religious practice. For Christians, the Word moves, and the body responds: "If we live by the Spirit, let us also be guided by the Spirit" (Galatians 5:25). This gets to the narrative structure of the Grand Cosmic Narrative. *Cosmos* uses music, visuals, and poetic language to evoke the typical associations of awe, wonder, and even a sense of shared origin. However, the GCN takes a step further in crafting a narrative that evokes emotions beyond wonder and awe by embodying a powerful story of our profound connection to one another and to the world. It compels the audience, even those skeptical of traditional religion, to understand, through both the mind and the body, that science reveals, and the body responds. So, being somewhat cheeky, we might come to acknowledge through the GCN that 'If we live by Science, let us also be guided by Science.'

Cosmos

For the final section of Chapter Four, I will present Episode One from both *A Personal Voyage* (APV), titled "The Shores of the Cosmic Ocean," and *A Spacetime Odyssey* (ASO), titled "Standing Up in the Milky Way," to draw out what I have detailed in this chapter and how we can view the contents of this chapter in action through the media text of *Cosmos*. Specifically, I will aim to draw out the use of narrative not only to build a meaning-making story that gives us a sense of place, time, and direction, but also to reoccupy the moral and conscious answer positions once offered by other myths, especially that of the Abrahamic

traditions. It is my position that the Grand Cosmic Narrative, in the form of *Cosmos,* has positioned itself as an alternative worldview for those whose belief structure is or would like to be situated within the material framework of science, specifically for those who may be "spiritual but not religious." This closing section will demonstrate how science in *Cosmos* is narratively framed to fulfill the mythic narrative structure that many have hypothesized as essential for the human condition. In doing so, I draw on the distinction established in Chapter Three among the three registers of enchantment—enchantment of the unknown (the porous self's experience of a Cosmos alive with mystery), enchantment of the revealed (the awe generated by what science discloses at overwhelming scales), and enchantment of the narrative (the investment of secular history with the affective weight of sacred story)—as well as the distinction between enchantment as affective orientation, mystery as epistemic condition, and meaning as durable existential framework. These distinctions are essential for understanding not only *what* the Grand Cosmic Narrative does but *how* it does it: which register it activates at any given moment, and how it mobilizes enchantment in the service of constructing meaning.

Cosmos: A Personal Voyage

Before Episode One of APV begins in the 2000 re-release DVD special collectors edition, which was digitally remastered, an introduction by Druyan plays where she reflects on the 20 years since the original release, saying, "Even after twenty years, *Cosmos* requires few revisions and indeed is rich in prophecy…*Cosmos* is both a history of the scientific enterprise and an attempt to convey the soaring spiritual high of its central revelation—our oneness with the universe" (01:29). Druyan invites the audience to reflect on this oneness and how science has allowed for a reconstruction of the sweep of cosmic spacetime and to "find our own part in its great story" (01:58). Two registers of enchantment are operating simultaneously in

Druyan's framing: enchantment of the revealed—"our oneness with the universe" is a disclosure of science, not a residue of the unknown—and enchantment of the narrative, in which this disclosure is cast as a "spiritual high," borrowing the affective vocabulary of transcendence to invest scientific knowledge with existential weight. With this framing of science and knowledge of the world as meaningful, worthwhile, and spiritual, the episode begins with Sagan's call to the mythic. Sagan's now-famous opening line is not a scientific claim, since it cannot be tested. The line reoccupies mythic status by being about the world and asserting that it is all there is. When Sagan tells viewers within the first minute of this episode of *Cosmos* that "the Cosmos is all that is or ever was or ever will be," this reaches beyond what the material nature of reality reveals and is instead an assertion based on inferences that are motivated by the religious, by the mythic, by the narrative that Sagan and Druyan wish to tell. The tone of *Cosmos* and what follows is set within that first moment of the programme.

Sagan makes this mythic claim while standing on the coast of the Pacific Ocean in California, south of San Jose, with the camera positioned to capture a wide vista of him along the shore from afar. These are the "shores of the cosmic ocean," he says, which is the title of this episode, and will be revisited in the opening of *A Spacetime Odyssey* and the newer *Possible Worlds.* As this is the starting point for the voyage across space and time, Sagan acknowledges that the universe is hard to comprehend: "lost somewhere between immensity and eternity is our tiny planetary home, the Earth" (03:56). Here, we can see the element of time at work. While not very descriptive, Sagan utilizes grand, mythic language to set the stage for the narrative to come and the voyage through space and time. "For the first time," he continues, "we have the power to decide the fate of our planet and ourselves" (04:02), directly confronting theological determinism, which posits that God decides our fate. "This is a time of great danger," he warns, "but our species is young and curious and brave. It shows

much promise…I believe our future depends powerfully on how well we understand this Cosmos, in which we float like a mote of dust in the morning sky" (04:30).[34]



Carl Sagan on the "Shores of the Cosmic Ocean" (APV Ep.1 - 03:18).

Sagan employs poetic, metaphorical prose throughout the series, but it is especially noteworthy here because it establishes, like his reference to unimaginable time and space, the cadence and transcendence of the Cosmos, its mythic-like status. That the Cosmos occupies

[34] In the book companion to *Cosmos*, Sagan and Druyan capitalize 'Cosmos', which no doubt underscores their aims of giving their story an even greater reverent quality (see p.4 for first use). Because of this, I too will use Cosmos as a proper noun.

time immemorial and space beyond understanding is very much akin to the major world religions' mythos; *Cosmos* even begins the series in episode one in both APV and ASO with a Creation-like story based on the data known at the time of filming. Furthermore, he clearly indicates hope for humanity, inviting self-determination to be a defining quality of our species. The referent of this hope here is the Cold War, which Sagan spent much of his later career publicly questioning, and which will play a central role in both Episodes 8, "Journeys in Space and Time", and 13, "Who Speaks for Earth?". The mythic language and hopeful posture of these opening moments bring into focus the reoccupation of one's position in space and time, as well as the answer to the question of how we should live. Here, the answer aligns with the principles of peace and prosperity.

Cosmos is about the universe and science, much like the grand narratives of science discussed in Chapter Two, but it is also "a story of our own planet and the plants and animals that share it with us, and it is a story about us…how the Cosmos shaped our culture, and what our fate may be" (05:17). To undergo this journey, we will need to "pursue the truth no matter where it leads but to find the truth, we need imagination and skepticism both" (05:30), Sagan says. Maintaining the episode's theme, "the Earth is the shore of the cosmic ocean" (05:53), but Sagan notes that our species has begun to reach out beyond our home planet, sending probes and spacecraft out into the unknown so as to be about "ankle-deep. And the water seems inviting" (06:04). To know the Cosmos is to know ourselves, Sagan claims, "We're made of starstuff—we are a way for the Cosmos to know itself" (06:22).

This claim is used in various ways across the three *Cosmos* series. Sagan and Druyan are doing something critical for the GCN here: they are establishing a type of Imago Dei ("image of God"), reoccupied and secularized in the material of the natural world. We are of the world, born from it, and made of it. To know the Cosmos and to pursue its mysteries is to look deeper into ourselves. The enterprises of the sciences have not all directly endeavoured

to make sense of our being, but when something as seemingly unrelated as the recycling of matter through stellar nucleosynthesis gives insight into the relationship between the lifecycle of stars and the origin and strength of our bones, we are immediately confronted with a relationality that transcended time and space by being vast, ancient, and deeply connected. The story of *Cosmos* is this tale, fuelled by the two elements of imagination and skepticism, with the hope and grace that follow from the moral lessons that emerge from this knowledge. A scientific understanding of cosmic interconnectedness offers a profound sense of identity and purpose, echoing the existential comfort and orientation that religious narratives have traditionally provided. All three registers of enchantment converge here: the mysteries that remain at the frontiers of cosmology and biology sustain enchantment of the unknown; the staggering fact of stellar nucleosynthesis—that we are, materially, the remnants of dead stars—produces enchantment of the revealed; and the narrative framing of this fact as a secular Imago Dei, a story of cosmic kinship and sacred origin, constitutes enchantment of the narrative. It is this convergence that gives the "starstuff" claim its force: it is not merely a scientific fact but a meaning-making proposition, one that directly addresses the "spiritual but not religious" audience I have aimed to highlight.

To learn this story, our story, Sagan tells us of the Ship of the Imagination (SotI), the vessel of our explorations across space and time, "unfettered by ordinary limits of speed and size, drawn by the music of cosmic harmonies. Perfect as a snowflake, organic as a dandelion seed, it will carry us to worlds of dreams and worlds of facts" (06:52). Sagan, holding up a dandelion seed in front of the shore and leaning against the cliffside, says "come with me" (06:54), and he lets go of the seed to be carried by the Pacific winds. As the camera follows the dandelion, the seed transforms into a large digital dandelion seed floating through space. This is our first glimpse of the angelically glowing blue-white ship. Haunting orchestral and synthetic music begins to play, a combination of the past and the future of music, titled

"Movement 3" by Evangelos Odysseas Papathanassiou (1944-2022), known professionally as Vangelis, a Greek composer whose works included *Chariots of Fire* (1981) and *Blade Runner* (1982).



Carl Sagan is about to let loose the famous dandelion seed that transitions into the Ship of the Imagination (APV Ep.1 - 06:53).

This cosmic journey starts from the "grandest scale we know" (07:10), where the computer-generated images seen on screen were what could be observed in the 1970s, meaning a depiction of galaxies forming long, thin chains, like "sea froth on the waves of space" (07:24), "some containing hundreds of billions of suns" (07:33). An image of the Hubble Deep Field, taken in 1995, and added for the 2000 special edition of *Cosmos*, shows

nearly 3000 galaxies, every point of light a galaxy. We transition inside SotI, the bright white light and symmetrical, curved design revealed in a wide, long shot of the interior, with Sagan and the control console seated in front of the viewfinder. The music is now reminiscent of a voluntary, the organ music played at a church between hymns, speakers, and events. Sagan details some of the physical characteristics of galaxies, opening a viewfinder on the floor to view a spiral galaxy. Laws control their shape; "We have just begun to understand these laws. The universe is rich in mystery" (09:24).

Science and the knowledge it reveals do not detract from the mystery of the world; in this view, it motivates us to peek behind the curtain of what lies beyond the given answers. Sagan encourages this thinking throughout the series, and indeed, Druyan and Soter continued it in the following *Cosmos* series. One such mystery Sagan dedicated significant time to in his professional career is the possibility of extraterrestrial life. Sagan explains that galaxies have a life span. They are formed, "live", and are eventually destroyed; they may even have a "tumultuous adolescence" (11:05). Sagan wonders aloud, "How many planets and how many civilizations might be destroyed?" (11:28). Continuing the voyage, through the viewfinder of SotI, a world appears that looks like Earth, with clear signs of a technologically advanced civilization. Sagan wonders about them, "Are they also a danger to themselves?" (19:09). In the SotI, Sagan flies past the Orion Nebula, which is not a star (as seen from Earth) but a star-making "factory", before arriving at our solar system. Flying past the familiar sites of Neptune, Saturn and Jupiter, Sagan provides a detailed overview of our solar system, citing data as recent as 1979, just a year before the programme aired. Then, at 27:37, halfway through the episode, the whole Earth is visible for the first time in the viewfinder of the ship.



Sagan looking through SotI's viewfinder at Earth on the journey that began from the outer reaches of our scientific knowledge (APV Ep.1 - 28:05).

The music becomes triumphant as the viewfinder shows SotI flying through the clouds over Earth's surface, Sagan smiles at the sight and the scene transitions to Sagan walking through a garden park, welcoming us to the planet Earth and says that "in the cosmic perspective, it is for the moment unique—the only world in which we know with certainty that the matter of the Cosmos has become alive and aware" (29:14). Sagan says that the search for life elsewhere "begins here, with the accumulated wisdom of the men and women of our species acquired at great cost over a million years" (29:28). Video portraits of people

from around the globe are shown going about their days as the triumphant strings and clarinets of Beethoven's 1st movement of his 7th symphony plays.

Sagan then appears before us, standing atop what seems to be a very old, perhaps ancient, watch tower in Egypt outside of the city of Alexandria. Sagan sits and begins telling the story of Eratosthenes, the Chief Librarian of the Great Library of Alexandria and a polymath, who was the first to accurately measure the Earth's circumference. Sagan explains how Eratosthenes encountered a curious problem while reading about a stick or pole making no shadow on the summer equinox. Using nothing but "sticks, eyes, feet and brains" (36:25). Eratosthenes experimented and reasoned the Earth's circumference was 250,000 *stadia*, or 39,690 kilometres, which puts this measurement within a margin of error of less than one percent.[35] Sagan uses Eratosthenes's ancient scientific experiment to reveal how simple curiosity, without fancy or expensive equipment, can uncover hidden truths about the natural world and how profoundly such inquiry can impact history.

Sagan, sailing towards Alexandria on the Mediterranean Sea, concedes that this type of inquiry was nurtured in an environment that encouraged it. As Chief Librarian of the Great Library of Alexandria, Eratosthenes was embedded in the" brain and glory of the greatest city on the planet Earth" (40:50). A miniature reproduction of what the library may have looked like appears, as Sagan tells us that if he could travel anywhere in time, "this is the place" (40:59). He walks through the recreated halls of the Great Library, one of the "first true research institutes of the world" (42:04), being struck with wonder at the foundations of knowledge that came from this site and the secrets hidden in the over 500,000 scrolls stored on its shelves. It is in this library that many of the great names in the ancient history of

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[35] See Christopher Matthew's recent book *Eratosthenes and the Measurement of the Earth's Circumference (c.230 BC)* (2023) for a comprehensive analysis of the history of the Eratosthenes' experimental calculation, where he concludes that a more accurate measurement (instead of the long held 252,000 *stadia*) is 224,100 *stadia*, or 40,338 kilometres, which is still under one percent margin of error. The publication *Nature*, and Sagan in *Cosmos* says as much, called this "one of the first great triumphs of scientific calculation" (1943).

science made their mark, including Hypatia. The mix of Greek and Egyptian cultures flourished until the Roman introduction of Christianity and the fall of the Great Library.



Sagan walking through a recreation of the Great Library of Alexandria, a place that will be visited in all of the *Cosmos* series (APV Ep.1 - 42:07).

My interpretation of this extended sequence of the ancient world, beginning with Eratosthenes and concluding with the Library of Alexandria, for this first episode, is that it serves two critical functions. The first is that it frames the pursuit of knowledge and the questioning of the natural world as having a deep history dating back to the foundations of civilization. The tale of Eratosthenes exemplifies the role of inquiry in the story of humanity, revealing the interconnected nature of knowledge and its far-reaching effects, which would have been entirely unknown to anyone at the time; Sagan emphasizes the connection between

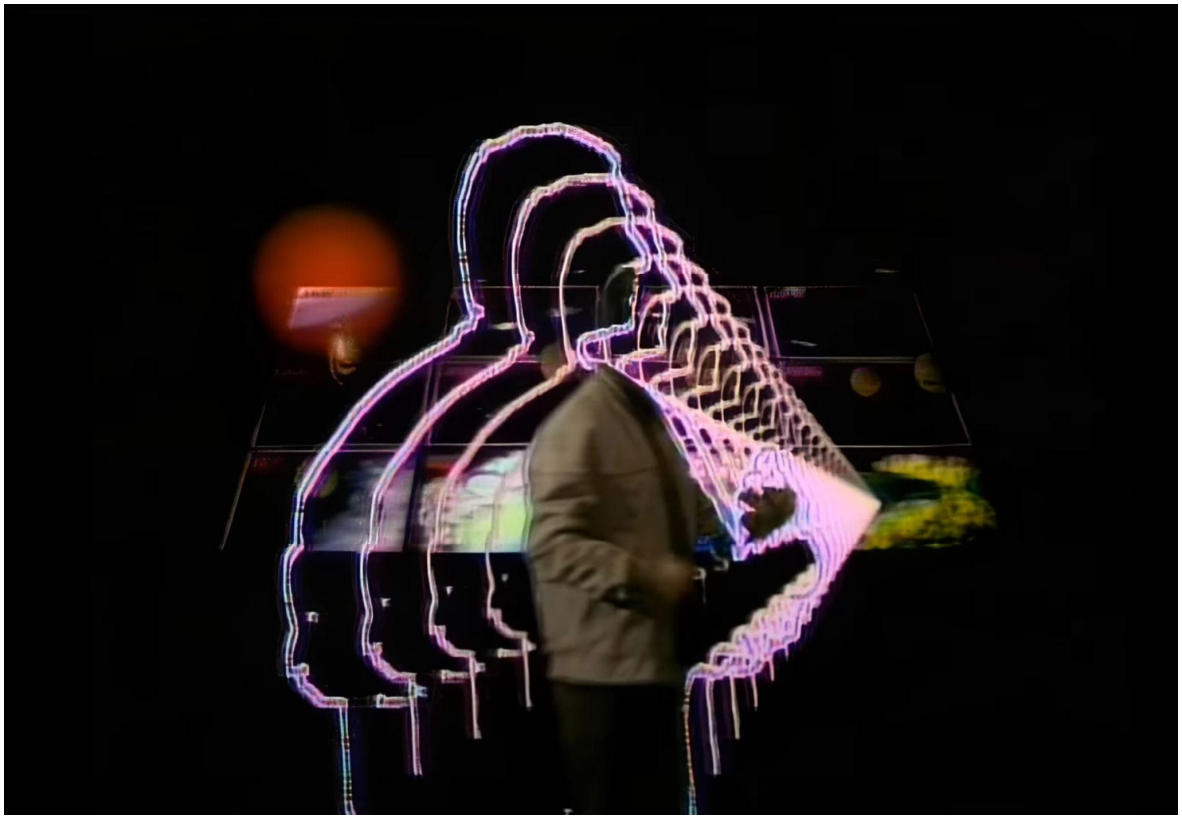
the knowledge gained during these ancient times and its role today. The pursuit of knowledge, then, is as old as humanity's many civilizations, if not older (at least a "million years"). And this leads directly into the second reason, in that the pursuit of knowledge, in the schema of the Grand Cosmic Narrative, is itself a meaning-making enterprise. The meaning of knowledge, when recorded, shared, and properly stored, becomes a source for future generations to build from. There is a hint of the conflict view on science and religion in this sequence, as the "martyrdom" of Hypatia is "bound up with the destruction of this place seven centuries after it was founded" (44:02). Sagan acts amazed and wonder-struck by the recreation around him, and as it should be clear, laments the loss of its collected knowledge. The flourishing of knowledge is the flourishing of humankind, and that is the ultimate meaningful achievement.

At this point, Sagan provides an introductory overview of *Cosmos* and the pivotal moments in human history that will be explored throughout it, concluding with Edwin Hubble's discovery of cosmic expansion. It is a grand and epic tale, but it is also a story of deep time, as Sagan says that "the long collective enterprise of science has revealed the universe to be some 15 billion years old" (52:58). To make sense of this incomprehensible age, Sagan introduces the Cosmic Calendar. In Chapter One of this project and the accompanying Cosmos Episode breakdowns throughout this book, I have emphasized the importance of the Cosmic Calendar for Cosmos. First introduced in Sagan's 1977 Pulitzer Prize-winning book, *The Dragons of Eden: Speculations on the Evolution of Human Intelligence*, the first chapter is titled "The Cosmic Calendar" and details via the written word the groundwork that would become the Cosmic Calendar in the television programme.

Sagan walks on the Cosmic Calendar, a mix of practical and digital effects, which is the size of an American Football field, to detail the physical cosmology of the universe from the Big Bang to the present. Walking from 01 January, representing the Big Bang, Sagan

walks chronologically through the known details of the universe's development since the literal beginning of time. However, as I detailed in Chapter One, the Cosmic Calendar humbles and places our undeniable connection with the universe and our small, relatively insignificant place in its vast and ancient story into perspective. The human story only begins at 23:46 on 31 December, and all recorded history occurs within the last minute of the Cosmic Year. However, Sagan is careful not to let in what Jonathan Haught, a Catholic theologian and Distinguished Research Professor at Georgetown University, refers to as "cosmic pessimism," which, "allegedly based on science, is a belief that the universe is altogether devoid of lasting meaning. If that belief is right, then religious symbols, ideas, and aspirations are nothing more than human concoctions" (2018: 34).

Instead of letting cosmic pessimism take hold, however, Sagan asks the viewer to consider that "we are the legacy of 15 billion years of cosmic evolution. We have a choice: we can enhance life and come to know the universe that made us, or we can squander our 15-billion-year heritage in meaningless self-destruction. What happens in the first seconds of the next Cosmic Year depends on what we do, here and now, with our intelligence and our knowledge of the Cosmos" (57:49). The Cosmic Calendar is the GCN's most sustained exercise in enchantment of the revealed: by compressing 15 billion years into a single calendar year, it does not mystify but rather discloses the scale of cosmic time in a form that overwhelms ordinary comprehension, producing the vertigo of temporal perspective that generates awe. But Sagan's closing exhortation—that what happens next "depends on what we do, here and now"—pivots from enchantment to meaning, translating the affective force of temporal revelation into a durable ethical orientation: stewardship, purpose, and collective responsibility.



After introducing the Cosmic Calendar, Sagan shrinks to walk on it to detail the last moments of the Cosmic Year (APV Ep.1 - 54:17).

What should be clear from this brief synopsis and analysis of the first episode of the original *Cosmos* series are two key aspects I have discussed throughout this chapter. The first is that Sagan, Druyan, and Soter crafted a very intentionally designed narrative that inspires, generates insights, educates, and motivates thinking not only of the knowledge amassed through the processes of science across time but that that knowledge gives us a direct relationship with the past in the long family tree of some million years of generational knowledge transfer, and beyond to the stars and the dawn of time itself. The second aspect is that, in reflection on and respect for the traditions of storytelling, ethical considerations, and the hopes for a better future free from self-induced danger, *Cosmos* attempts to build a moral

framework through mythic storytelling. Combining music, special effects, and meaningful language creates the conditions for the affectual interpretation of the story, leaving a lasting impression on the viewer. This is continued—and, in some ways, pushed further—in the revival of the series, which we will explore now.

Cosmos: A Spacetime Odyssey

This episode of ASO begins with a fade from black as waves crash onto the same rocks from APV are shown as Carl Sagan's voice is heard: "The Cosmos is all that is or ever was or ever will be" (00:07), and footage from APV of Sagan holding the dandelion seed and letting it go before the line "Come with me" is heard (00:10). The dandelion acts as a transition to a sweeping landscape shot in golden Californian light on the coast where "a generation ago the astronomer Carl Sagan stood here and launched hundreds of millions of us on a great adventure…It's time to get going again" (00:26). Tyson provides an overview of what's in store in this new series, giving a preview of the journey to come "from the infinitesimal to the infinite" (00:32). But Tyson tells us, as Sagan did thirty years before, that "*Cosmos* is also a story about us. It's the saga of how wandering bands of hunter-gatherers found their way to the stars. One adventure with many heroes" (01:13), and the new animation style, used when one of the "heroes'" stories is being told, is shown, which was created by the collaboration and support from Seth McFarlane, an American actor and animator known for *Family Guy,* who served as Executive Producer and was instrumental in bringing *Cosmos* back.[36]

[36] The British newspaper *The Guardian* did a feature on *Cosmos* shortly after the first episodes aired that revealed that McFarlane, given his status and popularity, was able to get Druyan full control of the show with Fox Broadcasting Company and its subsidiary National Geographic and a substantial budget (though this figure has not been disclosed) (Davis 2014).



The dandelion from Sagan's hand shown in the shot (white object on left side) just before this from the original series flies past the screen to transition to Neil deGrasse Tyson standing on "The Shores of the Cosmic Ocean" (ASO Ep.1 - 00:10).

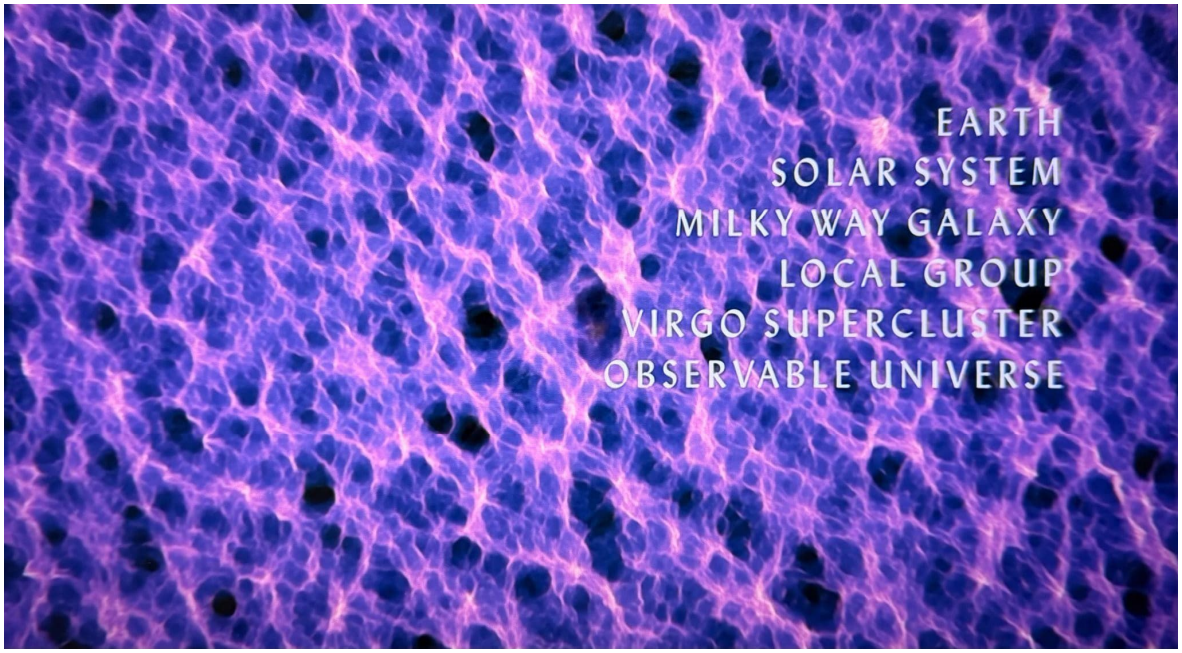
As Sagan did in the first series, Tyson tells us, "To make this journey, we'll need imagination, but imagination alone is not enough because the reality of nature is far more wondrous than anything we can imagine" (01:33). To support our imagination, Tyson offers a "simple set of rules" which can be equated with a rough estimation of a scientific method: "Test ideas by experiment and observation. Build on those ideas that pass the test. Reject the ones that fail. Follow the evidence wherever it leads, and question everything. Accept these terms, and the Cosmos is yours. Now come with me" (02:08). The camera then zooms out from Tyson, and he is aboard the new Ship of the Imagination (SotI). Less symbolic and representational this time, the new SotI is a sleek, perfectly reflective silver ship that

resembles an obelisk yet is simultaneously futuristic and timeless. In SotI, Tyson takes off from the "shores of the cosmic ocean" and into an orbit around Earth. Tyson then introduces the mechanics of SotI that will be used throughout the series: the present through the front viewfinder, the past through a portal on the floor and the future in a portal on the ceiling, metaphorically depicting time as above, as a direction to strive towards, signifying improvement and perhaps reflecting the ideals of progress held in the past.

Reversing the order from APV, here, on our introductory tour of the Cosmos as revealed by science, we start at Earth. Using the analogy of a mailing address, Tyson tells us that "to begin this journey, we need to know our cosmic address" (04:50), and the word "Earth" appears on screen. Powerful full-orchestral music plays as authentic satellite images of Earth from all over the planet are shown. "We are leaving the Earth, the only home we've ever known, for the farthest reaches of the Cosmos" (05:23). We are taken on a tour of our solar system, from Mercury to a detailed view of Jupiter and its great storm, past Saturn, and even past Voyager 1, a symbolic theme we will return to over the course of the series. We then see a bright star surrounded by a white haze forming a bubble around it. We are told that this is our Sun, and the hazy bubble is the Oort Cloud, a graveyard a lightyear out of a trillion comets that are the leftover building blocks from the creation of the "Solar System"—line two of our Cosmic Address.

After introducing Rogue Planets—planets ejected from their home system, which may number in the trillions—we are shown the "Milky Way" through the front viewfinder. Tyson tells us our home galaxy is the third line of our Cosmic Address, and it appears on screen. Speeding out and away from the Milky Way, SotI hovers with Andromeda and a few other galaxies in the background, and this, Tyson explains, has been called the "Local Group", the fourth line of our Cosmic Address. Speeding out even farther and faster, what appears as many bright strings of lights, we are told, is the "Virgo Supercluster", the fifth line of our

Cosmic Address. At this distance, each of the many lights that make up the glowing strings, which appear like a typical night sky full of stars, are, in fact, galaxies. “Yet the entire Virgo Supercluster itself forms but a tiny part of our universe” (14:16). The camera begins to zoom out as if rushing further away from the Virgo Supercluster, shifting the colours to red and blue until it blends to purple, forming long interconnected filaments composed of hundreds of billions of galaxies. “This is the Cosmos at the grandest scale we know…it’s the last line of our cosmic address”, as the full address is shown on screen—”Earth, Solar System, Milky Way Galaxy, Local Group, Virgo Supercluster, Observable Universe”—Tyson says, adding “for now” (14:30).



Our Cosmic Address, viewing the universe at the grandest scale we know “…for now” (ASO Ep.1 - 14:29).

“Feeling a little small?” (15:33), Tyson asks, anticipating the affect on the viewer this visual demonstration that the cosmic scale just shown may have. “In the context of the Cosmos—we are small…but we don’t think small. This Cosmic Perspective is relatively

new" (15:48), Tyson explains, using this opportunity to introduce the first 'hero' of our journey together—Giordano Bruno (1548-1600). Bruno's inclusion and story framing were probably the most controversial in the whole 2014 series. Not only was the first episode of a long-beloved series big news, attracting many more viewers than typically watch a science popularization programme, but some saw the use of Bruno as a martyr of science as controversial (Gryboski 2014, Hess 2014).

At first glance, seeing the conflict thesis at work here isn't too difficult. Bruno, a brave Italian monk, is cast out of the Catholic order for daring to read a book from the Index Librorum Prohibitorum, in this case, Lucretius's *De rerum natura* (1st C. BCE). Yet this is precisely the kind of moment that reveals the Complexity Principle at work within the GCN itself—the narrative deploys conflict-adjacent imagery even as it reaches for something more nuanced. For a general viewer, the emotional register of Bruno's persecution will almost certainly land as a straightforward conflict story: a brave thinker crushed by religious authority. The distinction between 'martyr of science' and 'martyr of free inquiry,' while analytically important and historically responsible, operates at a register that presupposes a level of engagement most viewers will not bring to a television programme. We must therefore acknowledge that the GCN contains within itself the very conflict framing it seeks to transcend—a duality that, far from weakening the analysis, demonstrates the Complexity Principle operating at the level of the text's own rhetorical strategies. Taken together with the Hypatia episode analyzed above, a pattern emerges: the GCN repeatedly draws upon conflict-adjacent imagery—the destruction of the Library of Alexandria, the burning of heretics, the suppression of inquiry—even as its broader argumentative arc moves towards complexity and reconciliation. This is not a contradiction so much as a feature of the narrative's rhetorical architecture. The GCN builds emotional momentum through conflict imagery, then redirects it towards a more nuanced vision. Whether a general viewer follows the redirection or retains

the conflict framing is, of course, an empirical question, one that underscores the distinction between the GCN's analytical complexity and its affect.

Bruno develops a theory of the universe based on his understanding of God as powerful and infinite, thereby mirroring these qualities. Bruno is ridiculed and rejected for his views, eventually jailed, and, with bravery and determination, rejects the Church and dies for his beliefs by being burned alive. On the surface, this is true; however, historical details reveal a more complex story. In the late Ronald Numbers' 2010 edited volume, *Galileo Goes to Jail and Other Myths about Science and Religion*, Jole Shackelford provides a lucid account that demonstrates the complexity of Bruno's epistemology, theology, and ultimate demise. Bruno's life and work epitomize the intricate interplay between science and religion during the Renaissance, challenging simplistic narratives about their relationship. Bruno's trial and execution by the Roman Inquisition in 1600, commonly cited as a martyrdom for science (as depicted in Cosmos), were significantly influenced by his theological dissent, which stemmed from his cosmological theory (Shackelford 2009: 60). However, at the time, theology and cosmology were rarely distinct from one another.

Bruno's advocacy of the Copernican heliocentric model is often cited as a primary reason for his condemnation. However, a closer examination of historical documents reveals that his theological positions were equally, if not more, provocative. His rejection of core Christian doctrines such as the Trinity, the virginity of Mary, and transubstantiation positioned him as a heretic under the scrutiny of the Inquisition (Shackelford 2009: 66). His cosmological views, which posited an infinite universe with innumerable worlds, may have tested his conflict with the Church, which held the Earth as the unique centre of God's creation, but the Church "did not impose thought control on astronomers, and even Galileo was free to believe what he wanted about the position and mobility of the earth, so long as he did not teach the Copernican hypothesis as a truth on which Holy Scripture had no bearing"

(Shackelford 2009: 65). The nuanced nature of Bruno's intellectual pursuits, which melded Neoplatonism, Hermeticism, and a fervent critique of Aristotelian philosophy, suggests that his thoughts on the Cosmos were part of a broader philosophical and theological critique rather than purely scientific inquiry, and that was the source of tension for the Church.

That Bruno is seen as a scientific martyr in *Cosmos* is not a recent appropriation but has been perpetuated since the 19th century in the wake of Andrew Dickson White and John William Draper's two influential books, which I have detailed in Chapter One and Two, both of which were motivated by a desire to frame the narrative of a historical conflict between science and religion given their political and theological views (Shackelford 2009: 61). Their portrayal of Bruno aligns with the Enlightenment and post-Enlightenment critique of religious institutions. This sentiment grew into the secularist propositions of the 1960s and was central to fostering a view of science as inherently opposed to religious dogma. This narrative simplification overlooks the fact that during Bruno's time, distinctions between science and religion were not made in the same way as they are presently (Harrison 2015). Theological and scientific inquiries were often part of the same continuum of intellectual exploration, and Bruno's writings are a complex mix of what could be considered scientific hypotheses and theological reasoning. The context of Bruno's thought and the circumstances of his death underscore the complexity of his life and work, as well as the difficulty of categorizing historical figures within distinct categories, such as "scientist" or "religious thinker."

However, I do not think that the framing of Bruno in the first episode of *Cosmos* is unfair, and in fact, I find it necessary for the narrative being built in the series. Tyson tells us that after Bruno, failing to spread his "gospel of an infinity" (21:00), made the fatal mistake of returning to Italy, it wasn't long before Bruno "fell into the clutches of the thought police" (23:53). As stated above, Shackelford wrote that "the Catholic church did not impose thought

control on astronomers" (Numbers 2010: 65), but I would contend that, from a certain point of view, they did. As the classic Orwell novel *1984* warns, thoughts are dangerous; you can think freely, but they can consume you and eventually transform into action. Those actions are condemned, often harshly or fatally. In *1984*, the protagonist Winston concludes that he "loved Big Brother" (Orwell [1949] 1990: 311). Orwell's novel, much in the same epistemological vein as the Enlightenment thinking that fed into secular studies, warns of the same fundamental conditions that Bruno found himself in—think what you want, but act on them to your peril. While not science as we understand it today, the role of thought in the punishment of Bruno, particularly his contemplation of nature and divinity, reflected the Church acting as arbiters of what knowledge could be public and what could not. The possibility and threat of punishment for thoughts being acted upon seems no different from thinking of murder as a crime, but the crime itself and the punishment being sufficient to control the vast majority of the population (Nagin 2013).



Giordano Bruno, summoning courage to adventure beyond the known in a dream during an animation, in the style used throughout *Cosmos: A Spacetime Odyssey* (ASO Ep.1 - 19:57).

The framing of Bruno as a martyr serves the purpose of the narrative being constructed for the GCN in that, recalling the "simple set of rules" from above, Bruno is not here a martyr of science as Shackelford rightly argues, but here, I claim, a martyr of free inquiry and that "freedom of speech [is] a sacred right of every individual" (23:13). This distinction, however, operates at the level of analytical interpretation rather than viewer reception. For most audiences encountering the Bruno sequence, the episode's visual and emotional affect—a solitary thinker persecuted by robed clerics—will almost certainly evoke the conflict thesis, regardless of the narrator's more carefully calibrated framing. We should be honest about this gap between the text's intended complexity and its likely affective impact. Episode 1 frames Bruno as a man who died, denied the ability to express his thoughts, in pursuit of a "grander and more glorious view of Creation," a principle of openness that the *Cosmos* series takes as a tenet of its GCN framework. Repression of ideas, the squandering of inquiry, no matter how difficult the discussion, no matter how much status and power are at risk, that is the task of anyone who seeks to push beyond what we think we know. This is what *Cosmos* teaches. Tyson paraphrases Shackelford (2009: 65) when he states what was at stake for the Catholic Church: "If Bruno were right, then the sacred books and the authority of the church would be open to question" (24:25).

While Bruno may have glimpsed the immensity of space and paid with his life for "his soaring vision of the Cosmos" (22:48) because of it, Tyson supposes that "he had no inkling of the staggering immensity of time" (27:17). Tyson uses this opportunity to reintroduce the Cosmic Calendar, which has been significantly updated with special effects provided by BUF and smaller studios like Tippett. He gives a brief overview of the 13.8 billion-year history of the Cosmos, with significantly greater detail on the origins of stars, galaxies, and our own solar system than was known in 1980. He also explains that elements like Gold, Iron, Calcium, and others that make up the world we know and our very bodies are

produced by the death of stars in supernova explosions. Tyson, walking into view through a rendering of a nebula, stares directly at the viewer and says, “You, me, everyone—we are made of starstuff” as he opens his arms wide and draws out the sentence for impact (30:48). Where Sagan delivered this line as a meditative reflection, Tyson’s staging—walking through a rendered nebula, arms wide, drawing out the sentence for impact—amplifies the enchantment of the narrative. The disclosure of stellar nucleosynthesis is no longer simply stated but performed, ritualized, invested with the bodily and affective weight that Schaefer’s framework would recognize as constitutive of felt knowledge. The audiovisual presentation imbues the viewer with rich sensory data, and the scientific content remains enchantment of the revealed, but the delivery has become something closer to proclamation: a secular creed spoken with the cadence of the sacred.

Life doesn’t begin “breathing, moving, eating, responding to its environment” (33:26), however, until 09 November, and it wasn’t until 17 December that the first animal made its way out of the water to begin life on land, with the fossil evidence of Tiktaalik discovered in 2004. “In the vast ocean of time that this calendar represents, we humans only evolved in the last hour of the last day of the Cosmic Year” (35:45), Tyson says as he picks up a primitive knife-tool, raising his eyebrows and looking directly at the camera. He continues this push, “11:59:46—all of recorded history occupies only the last 14 seconds” (35:59), as the music becomes choral and ethereal. Tyson kneels to the very corner of the Cosmic Calendar (recall it is presently the size of an American Football field), saying, channeling much of the tone of *Pale Blue Dot* (1994), “...every person you’ve ever heard of lived somewhere in there…everything in the history books” (36:05), as he points to the tip of the Calendar which suddenly glows in a beam of pale blue light.

As with APV, we need to “change scale” (36:27) and zoom in to view the Cosmic Calendar’s final moments. We are taken back slightly to 21:45 on New Year’s Eve, or 3.5

million years ago, for “we are newcomers to the Cosmos” (36:50); Tyson tells us our ancestors only just began to walk upright at this late hour as he kneels to touch a preserved footprint, a recreation of the Laetoli Footprint Trail. This is important to know as the genus *homo*, our species, have been overwhelmingly hunter-gatherers on the Cosmic Calendar for some forty thousand generations—all in the last hour of the Cosmic Year. In an exhilarating final push of information with the music beginning to build and match the increased tempo, Tyson unloads a barrage of thought-provoking information, accompanied by a rich animated sequence with imagery that helps the information resonate: 11:59, the first paintings, 14 seconds to midnight writing becomes a tool that allows us to “save our thoughts much further in space and time” (39:15), 7 seconds—Moses, 6 seconds—Buddha, 5 seconds—Jesus, 3 seconds—Muhammad, less than 2 seconds the two halves of the world met “for better or worse” (39:41), and less than 1 second ago science as more commonly known today takes us from first looking at the moon to four centuries later landing on it. All of this, Tyson claims, allowed for us today to “know when and where we are in the Cosmos” (40:13).



Tyson walking on the Cosmic Calendar, dramatically revealing how “we are made of star-stuff” (ASO Ep.1 - 30:41).

The scene ends, and we fade from black back to the shores of the Cosmic Ocean, where we began in California. Sagan’s voice plays: “We are a way for the Cosmos to know itself” (40:17). Tyson now outlines Carl Sagan’s legacy, highlighting his scientific contributions and achievements, and his commitment to science communication and outreach. We can glimpse the meaningful relationship that Ann Druyan, Sagan’s widow and co-writer of the Cosmos series, had with him, as well as the personal connection that Tyson shared with Sagan. Pulling off his shoulder a small, worn black backpack, Tyson pulls out Sagan’s diary from 1975 to tell the story of 20 December, when Tyson, just 17 years old, was invited to Sagan’s home in Ithaca, NY, in an outreach attempt for Tyson to attend Cornell for his Bachelor of Science. Visibly emotional from recalling the memory, Tyson tells us, “I already knew that I wanted to be a scientist, but that afternoon, I learned from Carl what kind of person I wanted to become.”



Tyson holds Sagan's calendar from 1975 and tells the story of how kind Sagan was to him (ASO Ep.1 - 41:22).

This ending is a clear example and a noticeable departure from the Epic of Evolution and Humanist Blockbusters I detailed in Chapter Two. Narratively, this is focused on the individual, represented by the intimate shots within the cabin of the Ship of the Imagination, and on the direct appeal of personal stories that give way to moral considerations. The continuity between APV and ASO, conveyed through the link between Sagan and Tyson and the personal story at the end of the episode, is revealing for two crucial reasons. The first is simply the powerful affect of the story itself, and the way in which that connection comes to the forefront of the rest of the experience in retrospect after the revelation of their connection. Tyson carries forward the torch of meaningful science communication in this series and throughout his own professional career. The second emphasizes the importance of the narrative on sharing, exchanging, and passing on to future generations, a theme that points to a fundamental truth of biological propagation: share what helps us succeed, reject that which

holds us back. The first episode is the narrative equivalent of a modern myth that not only tells us where we came from, but where we can go together.

Conclusion

This chapter continues my task of delineating the Grand Cosmic Narrative from other science-based narrative forms by presenting the final half of this work's philosophical considerations, revealing the sophisticated tapestry woven from the threads of narrative, myth, and affect. The Grand Cosmic Narrative not only encapsulates a chronicle of the cosmic story but is also profoundly influenced by our collective cultural and individual identities. It weaves a story that is narratively similar to the Creation of religious traditions while also deploying a parable-like narrative, threads that translate complex science into an accessible form, and carries moral and existential lessons. These function analogously to scriptural parables, offering viewers not just knowledge of the natural world but also a framework for meaning, awe, and ethical orientation within the universe. This thereby brings science and religion into dialogue, fostering a secular, naturalistic relationship between them. The exploration of the topics and themes in this chapter significantly contributes to our understanding of how the Grand Cosmic Narrative can bridge epistemological divides and foster a comprehensive worldview that harmonizes scientific insight with spiritual profundity for those seeking new worldviews that promote the development of science while rejecting established religions.

The Grand Cosmic Narrative, as articulated throughout this discussion, serves not only as a recounting of cosmic phenomena but also as a profound cultural instrument shaping our perceptions of the universe and ourselves. It fosters an ethos of responsibility and stewardship, mobilizing all three registers of enchantment—mystery as the ever-receding

frontier of what science has yet to disclose, the sublime of what science has revealed, and the narrative sacralization of secular history—in the service of a durable framework for meaning: purpose, ethical orientation, and a deeper connection with the Cosmos and each other. This narrative effort aligns closely with Blumenberg's concept of reoccupation, where ancient mythic structures are repurposed to address contemporary existential queries, embedding ancient wisdom within modern cosmological discourse. This process preserves the vitality of the Creation narrative. It ensures its relevance in a contemporary context, where scientific advancements continually reshape our understanding of the Cosmos, as evidenced by the differences between the two versions detailed above. It is my position that the Grand Cosmic Narrative reoccupies some of Christianity's long-held answer positions, something I will explore in more depth in the concluding chapter.

I also sought in this chapter to integrate affect into my narrative framework, as affect imbues the Grand Cosmic Narrative with a compelling, felt force, transforming our place in the Cosmos from a mere intellectual exercise into a deeply felt experience that binds us more closely with the world around us. This emotive stance and engagement with the world are critical, as they may enhance the narrative's capacity to instill the cosmic consciousness that Sagan, Druyan, Tyson, and others have advocated for, thereby fostering a global ethos of stewardship and interconnectedness. The affective dimension, drawing on Schaefer's theories, suggests that our engagement with narrative involves more than cognitive processing; it invokes a corporeal experience of the narratives that shape our perception of the Cosmos and our place within it.

Moreover, this chapter has highlighted how narrative operates as a powerful agent of cultural stability, transmission, and the formation of personal identity. By engaging with Bruner's and Gottschal's theories, we understand that narratives do more than tell stories; they construct realities and shape the collective consciousness, influencing how societies

understand themselves and their environments. The Grand Cosmic Narrative, in this light, is not just a story but a cultural schema that organizes our understanding of the universe and our ethical responses to it. In addition, the discussion has critically engaged with the philosophical underpinnings of narrative construction, utilizing Blumenberg's work to explore how myths can be reframed to resonate with contemporary audiences. This reoccupation of mythological elements within the Grand Cosmic Narrative preserves their relevance and enriches the narrative with a layer of complexity that appeals to both the ancient and the modern aspects of human inquiry.

The exploration of narrative's role in shaping cultures and identities has led us to understand that the narratives we adopt and adapt reflect our worldviews and actively shape them. As such, the Grand Cosmic Narrative serves as a prism through which we can view the intertwining of scientific and religious narratives, providing a unique lens to examine the Cosmos not only as a physical space but also as a metaphysical one. The GCN's cultural aspirations—to foster a sense of cosmic belonging and ecological responsibility—position it as a potentially significant force in contemporary meaning-making, given the slow decline in religious participation across the North Atlantic world. Whether it can achieve these aspirations, and what the cultural consequences of its success or failure might be, are questions that merit further empirical investigation.

This chapter has demonstrated that the GCN integrates narrative structures, mythic resonance, and affective engagement in ways that distinguish it from prior science-based narrative forms. The cultural work it performs—reshaping perceptions of cosmic belonging, temporal scale, and ethical orientation—warrants analysis not merely as an academic category but as a functioning cultural phenomenon with observable effects on its audiences. These effects manifest in the programme's persistent cultural presence, its citation across popular media, and its demonstrable resonance with audiences seeking secular frameworks

for meaning-making, even if the precise scale and depth of that influence remain difficult to quantify. As we move into the final content chapter on science popularization and communication, the Grand Cosmic Narrative stands in sharp contrast to what has come before, urging us toward a more harmonious and interconnected understanding of the universe and our relation to one another. This exploration into the narrative, myth, and affect within the context of the Grand Cosmic Narrative thus serves as a foundational contribution to our understanding of how deeply narratives can influence both individual and collective consciousness. It underscores the importance of narrative forms in constructing our realities and shaping our responses to the Cosmos, providing a profound insight into the power of stories in human life. As we advance in our scientific endeavours and spiritual explorations, the Grand Cosmic Narrative exemplifies how narrative forms continue to perform the cultural work of unification, inspiration, and orientation—functions historically associated with religious and mythic traditions.

Chapter Five

Science Communication and Science Popularization, Popular Culture and Rhetoric

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…we were hunters and foragers… The frontier was everywhere. We were bounded only by the Earth and the ocean and the sky… The open road still softly calls, like a nearly forgotten song of childhood… For all our failing, despite our limitations and fallibilities, we humans are capable of greatness…

– Carl Sagan, *Pale Blue Dot* (from the opening of *Cosmos: Possible Worlds)*

Introduction

My overarching claim is that the narrative of *Cosmos* sets it apart from other texts of science communication/popularization. *Cosmos* is more than an account of science or a treatise on science; it is a story about who we are, where we came from, and where we can go. In this way, *Cosmos* reoccupies the structural position of mythic narrative in incorporating and reworking motifs drawn from religious traditions, especially Abrahamic ones, to perform the orientation-producing cultural work that such narratives have historically performed. Sagan's

rich prose, his posturing at possible worlds yet to come, and his reflections on how far we have come, contribute to a story that delivers emotional resonance with an affect magnified because the viewer, evidenced by the sheer number of views and cultural relevance of *Cosmos* and Sagan and Tyson, embodies and feels—through audio and visual means—the epistemic framework that science has provided that Sagan and Druyan weave into a meaningful narrative. This is what separates a Grand Cosmic Narrative (GCN) from other science communication and popularization texts that have come before.

We have now nearly completed the work of filling our tool chest for constructing the Grand Cosmic Narrative as a new narrative genre that bridges the realms of science and religion for secular individuals, those seeking alternatives, and others. Having covered different grand narratives of science that popularized science—which I have claimed are not the same as the GCN—and having given philosophical depth to our discussion in Chapters Three and Four by examining science's role in disenchantment, secularization's impact on grand narratives, and postmodern critique, we then moved to more direct elements: narrative, myth, and affect. Throughout, cognizant of the Complexity Principle, I have reflected on the interplay between science, religion, and spirituality.

Chapter Five focuses on the popularization and communication of science and its role in shaping public discourse and perceptions. While we have considered the Epic of Evolution and the Humanist Blockbuster, we must now explore science popularization and science communication more systematically, uncovering their differences, if any. This is critical because *Cosmos* is a popular science communication text, broadcast worldwide and viewed over one billion times. *Cosmos*, viewed as a text of popularized science, will reveal the differences between the GCN and previously established grand narratives of science. As such, we will also spend some time looking at popular culture as a field of study.

The form and shape of science communication can be traced to 19th-century natural historians, philosophers, and organizations that sought to share key developments with the broader public in the wake of industrialization and growing interest in education (Lightman 2007, 2016). Figures such as Michael Faraday (1791-1867), who developed popular lectures at the Royal Institution, believed in sharing knowledge and inspiring critical thinking about advances in science. As James Secord (2004) influentially argued, we must attend to "processes of movement, translation, and transmission," understanding that scientific developments cannot be separated from their modes of communication; "what once made sense as the 'Darwinian Revolution' must be recast as an episode in the industrialization of communication and the transformation of reaching audiences" (Secord 2000: 4). Jonathan Topham (2009) called for abandoning the artificial separation between "science proper" and "popularization," arguing this configuration represents "just one among many configurations of the relations between science and society at large." The 19th century is thus pivotal in the development of modern science communication, not as a derivative activity but as constitutive of scientific practice itself, driven by technological innovation, social transformation, and professionalization (Nielsen 2022).

The professionalization of science, distinct from learned men and hobbyists, combined with growing literacy and textual accessibility, created conditions for modern science journalism. Industrialization created demand for scientific literacy among workers and stimulated educational reforms: Britain's Education Act of 1870 led to increased demand for "cheap science textbooks for the schools and for the production of more 'popular science' works for the entire population" (Lightman 2016: 343). As science became increasingly professionalized—with universities establishing research laboratories and defining science as a specialized discipline—a gap emerged between expert practitioners and interested publics, necessitating new intermediaries (Bowler 2015). By Darwin's *Origin of Species* in 1859, "the

British public looked not to practicing scientists but to a growing group of professional writers and journalists to interpret the larger meaning of scientific theories" (Lightman 2007: 1). The 1860s to 1880s witnessed what Lightman calls the "golden age" of science popularization, as editors and journalists "conceived of their readers as co-participants in the creation of knowledge" (Lightman 2016: 343). The convergence of print technology, market forces, educational expansion, and scientific professionalization produced the distinctive configuration of science communication that continues to shape how scientific knowledge circulates (Fyfe & Lightman, 2007).

Peter J. Bowler's recent work, *Evolution for the People: Shaping Popular Ideas from Darwin to the Present* (2024), approaches the "Darwinian Revolution" as a shift toward understanding science communication as a complex, multi-directional process rather than simple transmission from experts to passive publics. His focus on "bridging the gap" between elite scientific discourse and popular understanding reveals how mass-market publications created "a host of commentators who presented science news in ways that the scientists themselves sometimes did not like" (Bowler 2024: 3). Tension between scientific authority and popular interpretation became particularly acute in evolutionism discussions, where pre-Darwinian developmental models often persisted in popular representations long after Darwin's works had gained acceptance among professionals. The result was a cultural landscape in which "Darwin became a symbol for ideas his own approach was trying to supersede," as intermediaries adapted evolutionary concepts to fit existing cultural frameworks and audience expectations (Bowler 2024: 2).

Bowler's methodological implications challenge historians' conceptualization of the relationship between scientific knowledge and public culture. By "concentrating on the low- and middlebrow publications while including specialist and highbrow literature only when it attracted wider attention," Bowler demonstrates that popular science communication was not

merely diluted elite discourse but rather a distinct arena with its own dynamics, constraints, and creative adaptations (Bowler 2024: 8). This aligns with Secord's concept of "knowledge in transit," recognizing that scientific ideas are transformed as they move through different social spaces and media formats, shaped by publishers' practical considerations, educators' pedagogical goals, and mass audiences' entertainment expectations (Secord 2004). Understanding how evolutionism "impacted on the public consciousness" requires attention to the "variety of formats and participants central to the study of popular science," from cheap periodicals to museum displays to public lectures, each presenting evolutionary theory through distinct rhetorical strategies and visual conventions (Bowler 2024: 1).

This multiplicity of formats developed in the 20th century, including radio and television, providing new platforms for disseminating scientific knowledge to broader audiences while simultaneously driving adaptation in presentation. Today, science communication has adapted to platforms enabled by our always-connected lives. Social media, podcasts, and short-form visual media like YouTube Shorts and TikTok have become key channels for communicating scientific information, with both benefits and drawbacks. Influencers and celebrities now play significant roles in science popularization alongside traditional media. Platforms like YouTube and X have enabled science communicators such as Neil deGrasse Tyson, Bill Nye, Jennifer Wiseman, Richard Dawkins, and Katherine Hayhoe to reach global audiences, and PBS's YouTube channels, such as Crash Course and Spacetime, have made science communication engaging and accessible to younger generations.

Since the 19th century, science communication has developed a body of academic research, particularly in the last 20 years, that provides frameworks for understanding how scientific information is communicated and received. The most notable is the Deficit Model, which assumes the public lacks knowledge and has been criticized for being too simplistic

and for failing to consider diverse ways people engage with scientific information. The Dialogue Model emphasizes two-way communication between scientists and the public, while the Participatory Model focuses on engaging the public in the scientific process. These models have limitations and have been criticized for not fully capturing the complexities of science communication. I will detail these models of science communication in the next section.

As hinted in Chapter Four through Donovan Schaefer's work (2022), science communication today faces several challenges: public skepticism, misinformation, and the balance between simplification and accuracy. Cultural contexts influence how scientific information is received and interpreted, affecting public skepticism and contributing to the spread of misinformation. The rise of "fake news" and the proliferation of social media misinformation have made striking a balance between simplicity and accuracy increasingly important. Figures such as Tyson, Nye, Brian Cox, and David Attenborough have used various platforms to engage audiences with scientific topics and debunk misinformation, with varying effects. Ethical considerations in science communication are also growing due to the ease of access and the popularity of popularizers.

This chapter delves into science popularization and communication, focusing on differences in narrative framing, language, visuals, audio, and audience engagement. To provide greater definition to science popularization, I will briefly unpack the role of rhetoric in science and science communication, and how science popularization fits within popular culture. Integrating rhetorical studies into the study of science communication offers rich insights into the linguistic and strategic mechanisms of science popularization, uncovering the underlying principles that make scientific storytelling compelling and persuasive. Moreover, using these tools reveals the interplay between science and religion in science communication and popularization. I will pay special attention to connections with spiritual

and religious connotations. I claim that re-enchantment plays a special role in popularizing science. As I established in Chapters Three and Four, the GCN mobilizes distinct registers of enchantment—the unknown, the revealed, and the narrative—each of which intersects differently with the rhetorical strategies of science communication. This chapter examines those strategies—ethos, pathos, and logos—and will show how *Cosmos* deploys them in the service of enchantment, making its grand narrative not merely informative but affectively compelling.

As with past chapters, I will finish with an analysis of the final episodes from both *Cosmos: A Personal Voyage* (1980) and *A Spacetime Odyssey* (2014), using them as paradigmatic of the GCN in action. Through this detailed examination, I will highlight how the GCN not only differs from other types of science communication but also functions as a narrative and rhetorical bridge between scientific understanding and spiritual meaning, serving as a form of secular spirituality that resonates with contemporary audiences growing increasingly "spiritual but not religious" in a world where it is one option among many.

A Brief Overview of Science Popularization and Communication

Before beginning, I should introduce the two terms at stake in this chapter—communication and popularization—as they pertain to science. Some of the most active and recent work on science and technology communication and popularization (STCP) is being conducted by scholars in China and Australia, with notable contributions from Britain. Two recent and significant contributions to this area of research are Gascoigne et al.'s (2020) *Communicating Science: A Global Perspective* and Ren and Zhai's (2014) *Communication and Popularization of Science and Technology in China*. Both offer extensive collections of scholarship on these overlapping fields and illuminate the enduring difficulty of distinguishing between them. As Gascoigne et al. note, "science communication has many

definitions and not all researchers or practitioners agree on its goals or boundaries…This confusion over a definition is reflected in the terminology used internationally" (2020: 11), with science popularization—and at times even "vulgarization"—being used interchangeably with science communication. While this brief section will not clear up the confusion, my claim is that, within the context of this dissertation, the differences are not conceptually distinct enough.

The confusion stems from the diversity of usage, which presents a conceptual problem, but one that we can overcome. While there is an intuitive difference between "communication" and "popularization" that helps clarify the kinds of work done under each label, the differences in practice are minimal. Stripped of modifiers, communication is a neutral and universal act—the simple exchange of information, as when birds, apes, dolphins, or bees communicate. Words may add meaning to the information, and adding science specifies the subject and the social intent: scientific knowledge is communicated to "inform, engage, persuade, change behaviours and support better decision-making" (Gascoigne et al. 2020: 12). Popularization, in turn, refers to making knowledge broadly accessible and appealing. The Oxford English Dictionary defines it as "(sometimes with negative connotation) the presentation of a technical or specialized subject in a generally intelligible or appealing form" (OED 2023). The negative connotation, especially relevant for Carl Sagan as discussed in Chapter One, arises from the suspicion that accessibility entails simplification, muddying the details in, perhaps, dishonest ways. Yet the definition itself shows why the terms are easily conflated: to make science intelligible and appealing is also, in effect, to communicate it.

The only meaningful distinction really lies in the orientation these two take. While both science communication and popularization are broad institutional and methodological enterprises, communication typically encompasses efforts by research projects to disseminate

scientific findings and practices to diverse audiences and contexts. As Trench and Bucchi (2010) observe, it spans "all forms of communication, from technical publishing and science journalism to public engagement and participation" (3). Science communication's purpose is to foster dialogue among scientists, policymakers, educators, and the public—cultivating informed, critical, and participatory engagement with science. Science communication encompasses both specialist and non-specialist channels, but it is almost always distinguished from popularization by being transmitted on behalf of active researchers or their host organizations to relay information—this is the critical difference. Communications may come from academic publishing and policy briefs to museums and citizen-science initiatives. It privileges accuracy, inclusivity, and two-way exchange (Burns, O'Connor & Stocklmayer 2003). A clear example of this would be the National Science Foundation (NSF) press announcement of the discovery of gravitational waves in February 2016, five months after the discovery.[37]

The orientation of science popularization, by contrast, occupies a more specific and culturally inflected role within this broader communicative field. It directly engages in science communication, but here, through the translation of specialized knowledge into different narrative strategies—such as metaphor, plot, characters, and, in the case of *Cosmos,* allegory—it creates an imaginary of science for a general audience. Gregory and Miller (1998) describe it as the effort to "bring science to the people" (8). Its aims are affective and cultural as much as cognitive: to foster curiosity, enthusiasm, and identification with science. Popularization often occurs through mass media—long-form television, books, documentaries, and digital platforms—and foregrounds clarity, story, and spectacle. As Bensaude-Vincent (2001) argues, popularization bridges the gap between science and culture, making science part of the common symbolic world rather than the preserve of an expert elite

[37] See this video for the broadcast: https://youtu.be/zpusGtb_wL8?si=ymT-CNoLpf2hjzMV

(110). The affectual and narrative elements are the critical components that distinguish communication from popularization.

This difference in orientation has shaped disciplinary approaches too. Scholars in Science and Technology Studies (STS) typically focus on science communication, approaching it through a constructivist epistemology that treats knowledge as a social product. Rooted in David Bloor's (1976) "Strong Programme," STS suspends external judgments about truth or rationality and studies how scientific authority is produced through institutions, practices, and discourses (Bloor 1976; Cetina 1999). From this perspective, communication is not merely the transmission of pre-formed knowledge but a process that helps constitute what counts as knowledge. This explains STS's strong presence in science policy, where understanding communication as a site of power and value is crucial (Jasanoff 2004; Davies 2023).

Historians of science, by contrast, have primarily focused on popularization, which is a historical phenomenon with its origins in our relatively recent past. Following James Secord's (2004) notion of "knowledge in transit," historians examine how scientific ideas have circulated through particular media, genres, and publics, and how distinctions between "expert" and "popular" knowledge were constructed and contested (Bensaude-Vincent 2001). Studies such as Lightman's (2007) reveal how the nineteenth-century lecture hall, illustrated periodical, and popular book helped shape not only public knowledge but the very identity of science as a cultural enterprise. For historians, popularization is not a mere adjunct to science but one of its constitutive forms—a process that continually redefines what counts as legitimate knowledge.

However, these differences in orientation do not constitute a significant conceptual problem, and to overcome them, we only need to recognize that science popularization does, in fact, communicate science, and to communicate science, especially when the public is

involved, is to popularize it.[38] Recall that science is so hyperspecialized today that any meaningful engagement with the public demands the rhetorical strategies that popularizers use; therefore, science is simultaneously popularized and communicated, and this is undoubtedly true of *Cosmos*. While the gravity wave announcement can be neatly packaged as science communication, it nonetheless popularizes science by presenting a significant astrophysical discovery to the general public. In Chapter One, I argued that Sagan and Druyan believed that science education in the United States was suboptimal, so I contend that many who watch or listen to science popularization are engaging with that information for the first time, thereby making popularization a form of communication. Through *Cosmos*, and Sagan and Tyson's many best-selling writings, scientific information is conveyed not only to communicate but also to translate the knowledge that science provides into attributable moral and existential meaning, weaving narrative and metaphor into a grand vision of humanity's place in the universe. Their style—charismatic, poetic, and accessible—follows a historical lineage of popularizers and communicators who sought to democratize science while resisting charges of vulgarization. The case of *Cosmos* thus shows that the blurred boundary between communication and popularization can itself be productive: it occupies the space where the dissemination of knowledge becomes an act of cultural creation—a narrative that blends science and religion.

A Brief History of Science Popularization and Communication

The origins of popular science, according to Bernard Lightman, "is inextricably connected to the transformation of all publishing and reading in the nineteenth century" (2007: 18). So too is the case for science communication. In Victorian Britain, not only was the accessibility of

[38] This fact may have contributed to some of the blockages Sagan faced, such as his denial of tenure at Harvard and by the US National Academy of Sciences.

print rapidly and drastically changing the landscape of the reading public, as James A Secord refers to it as a "geographies of reading" (2000: 156), but so too were the institutions of science. With an increasingly accessible repertoire of science texts available to consumers, interest in science outside of the pages of books also grew publicly, as groups of professional and amateur naturalists formed, contributing to the tightening of boundaries regarding which sciences were practiced by whom and the professionalization of science as an occupation—an example of this being the X-Club.

However, already established institutions of acclaim, influenced by the cultural zeitgeist and motivated to inspire a scientifically literate public, would begin communicating science through popularization, though the audiences they reached varied considerably. The Royal Institution, founded in 1799 and sustained by its wealthy London membership, became a celebrated venue for public science under the leadership of Michael Faraday (1791–1867), who inaugurated the historic Christmas Lectures in 1825. Faraday's ability to elucidate complex phenomena through engaging demonstrations for all ages made his lectures immensely popular and set a standard for public science education (Cantor 1991). The British Association for the Advancement of Science (BAAS), founded in 1831 in York, pursued a more deliberately accessible model: holding annual meetings in a different city each year and cultivating an open membership that extended the reach of science communication well beyond London's elite.

The BBC, founded in 1922, has a rich history of science programming and has become a significant platform for science communication to the British public. As Alexander Hall of McMaster University has demonstrated, the BBC has been a vital source of programming for educating the public on evolution, particularly with over 1,000 programmes aired between 1945 and 2009 on this topic (Hall 2019). Programmes like *Story of Science*, *Children's Hour*, *The Common Sense of Science*, and *The Brain's Trust* brought scientific

discussions into people's homes in ways more intimate than ever before, for the inclusion of sights and sounds for the masses brought important and novel levels of awareness, insight, and interest (Hall 2019). Science documentaries and series remained popular, and David Attenborough's nature documentaries made him a household name. Programmes such as *Zoo Quest* and *Life on Earth, released* in 1979, were incredibly popular, bringing high-quality science content with cinematic filmography to audiences' homes.

Today in the UK, science festivals, such as the Edinburgh International Science Festival, beginning in 1989, and the British Science Festival, being the annual meeting of the British Science Association (changed from the BAAS in 2009), continue to play a significant role in public engagement, offering a wide range of activities, talks, and events, reaching audiences of over eight-thousand people (British Science Association 2024). This festival trend also marks an increased focus on interdisciplinary approaches to science communication. Integrating the arts, humanities, and social sciences has created more engaging and relatable science narratives (Edinburgh Science Festival, 2020). Furthermore, scientists and public health officials have used various media, notably social platforms such as X (formerly Twitter), Instagram, and YouTube, to disseminate scientific information and combat misinformation, aiming to better inform the public. This was made apparent across the North Atlantic world during the COVID-19 pandemic, when public policy and discourse on viruses, vaccines, and health measures became a hotly contested political, cultural, and social issue—science communication was at the forefront here.

Historical scholarship on science in the United States is far richer than it is for Canada, although this may be beginning to change (Riedlinger et al. 2019; Riedlinger, Barata, & Schiele 2019; Riedlinger, Riedlinger, Schiele, & Barata 2021). While the two countries share ancestry with the UK, they undoubtedly have cultural, scientific, and practical differences, and these play significant roles in the practice, sharing, and uptake of science.

During the 19th century in Canada, riding the wave of enlightenment emanating from the British Empire's seat in London, many learned societies began and grew, such as the Natural History Society of Montreal in 1827 and the Royal Society of Canada in 1882. The two primary cultures of Canada—French and English—put Canada in a unique and precarious position, one of both tension and optimism. Tension from the diversity of views, economic and developmental competitions, and political contestations between French and English, but also optimism as a model of ways forward for seemingly different peoples; the Governor-General, the Marquess of Lorne, who founded the Royal Society of Canada (RSC) did so with the hope that by modelling the RSC on both the Royal Society and the Académie des Sciences would be a way forward to bring both groups together (Levere 1988).

Science communication in the USA during the 19th century also became a matter of national importance, with the establishment of the American Association for the Advancement of Science (AAAS) in 1848. The AAAS has played—and continues to play—a crucial role in promoting scientific knowledge. Public lectures and publications by scientists such as Louis Agassiz and Asa Gray, as well as the founding of *Scientific American* in New York City in 1845 by Rufus Porter, helped popularize science among the general public, which, at this time in America, was crucial for the country's envisioned future. Science communication across the North Atlantic world was increasingly seen as a way for countries to advance national interests and bring the public into the fold of science literacy.

The 20th century also saw an increase in the inclusion of science in school curricula, reflecting a growing recognition of the importance of science education (Gidney and Millar 2012). In 1916, while World War I was laying waste to hundreds of thousands of men in Europe, the government of Canada decided to establish a national strategy "to promote Canadian scientific progress to the public along with making investments in science and technology research" by creating the NRC, the National Research Council (Riedlinger 2020:

176). But it was World War II and the post-war eras that marked a significant expansion of scientific research and communication in Canada. Government investment in science increased dramatically, with the NRC's operational expenditures rising from $1,041,431.59 in 1938 to $8,457,033.02 in 1948 (National Research Council, 1939, 1949). In the USA, the development of the atomic bomb and the subsequent Atomic Age brought science and technology to the forefront of public consciousness. Government agencies, such as the National Science Foundation (NSF), established in 1950, began to play significant roles in funding, promoting, and communicating science, thereby influencing public perception of the Space Race and spurring substantial investment in science education and communication. The launch of Sputnik in 1957 led to the creation of NASA, increased funding for science education, and emphasis on science in school curricula, reflecting a growing recognition of the importance of science education and public outreach in the wake of a 'national embarrassment' from Soviet gains in successful space technologies (Urban 2010).

The post-war era also saw the introduction of television and radio programmes, which harnessed their novel technological advances to educate and inform the public about scientific developments (Jones 2017). Institutions like the Canadian Broadcasting Corporation (CBC), established in 1936, featured science-based and other educational content in response to the political and cultural environment of the time, such as World War II (Buck 2006). Emerging issues, such as the environmental movement in the wake of Rachel Carson's 1962 work, *Silent Spring*, and the first Earth Day in 1970, brought pollution and conservation into the living room. The establishment of the Ontario Science Centre in 1969 provided interactive environments for the public to engage with science, reflecting the growing demand for science communication and popularization. Similar to American television producers like PBS, which launched its long-running science programme *NOVA* in 1970, and the Discovery Channel in 1985, these platforms have brought scientific concepts to a larger

audience than ever before. The Discovery Channel, for instance, has over 397 million global viewers (Discovery Channel 2024). This usefully contextualizes the reach of *Cosmos.* The GCN's significance lies not in unparalleled viewership numbers *per se,* but in the distinctive character of its narrative project: the sustained, intentional construction of a meaning-making framework that engages with questions of purpose, identity, and the sacred in ways that most science programming does not.

Today, online platforms allow scientists and science communicators to reach larger audiences than ever before (Peters et al. 2014). The likes of Neil DeGrasse Tyson and Richard Dawkins host regular discussions on social media platforms such as YouTube. Television programmes such as "The Nature of Things," which was hosted by David Suzuki, and radio shows like "Quirks & Quarks", both on CBC, became important sources of scientific information for the Canadian public. Social media platforms, in particular, have given rise to science influencers who utilize platforms like YouTube, X, and Instagram to communicate science directly to the public. Personalities such as Bill Nye the Science Guy, Michael Stevens (the YouTuber behind Vsauce), Hank Green, and Cleo Abram have substantial followings on these platforms and others. This has been followed by science communication becoming an academic subject, with new departments being created, such as at McMaster University in 2023, where researchers explore effective ways to communicate complex scientific ideas to diverse audiences.

Models of Science Communication and Popularization

Science communication and popularization are still relatively new areas. My brief historical introduction is only a small sampling. Still, it provides the necessary context to understand that science, as a broad body of knowledge that people, organizations, and governments find compelling enough to share with others for economic, ideological, or educational reasons, is

quite modern. While this has some implications for academic work in this area, as there are only a handful of contemporary academic programmes in Science Communication and Science, Technology, and Society (STS), this is changing. This change has brought together several theoretical frameworks developed over the past forty years by scholars studying science communication. In this section, I will provide an overview of four primary models of science communication, as detailed by Bruce Lewenstein (2003) and others, highlighting each model's strengths and weaknesses and comparing them to each other. I will also include a fifth model, one that appears to thrive in an age of rapid digital access via social media. We will cover the deficit model, the contextual model, the lay expertise model, the participation model, and the dialogue model.

The Deficit Model

The Deficit Model, also known as the Knowledge Deficit Model, is the earliest model of science communication, with historians identifying traces in the 19th century. This model is predicated upon a belief that public skepticism or disinterest in science stems from a lack of knowledge. Its basis is that providing more information will bridge the knowledge gap and lead to greater public acceptance of scientific facts. This mode is characterized by a one-way flow of information from scientist to public. The deficit model is predominantly used by scientists in a top-down approach to this day, and several studies show that most scientists adhere to it when communicating with the public (Davies 2008; Dudo & Besley 2016). Natural historians and philosophers were keen to spread scientific knowledge, with Thomas Henry Huxley arguing that it is "our highest duty to recognize the advisableness of improving natural knowledge" (Huxley 1904: 41). To improve natural knowledge was to advance the human race toward "maturity." Huxley used the Plague of 1664 and the Great Fire of London

as case studies, insisting that knowing causes and mechanisms is the surest way to avoid such disasters in the future.

One notorious example is Richard Dawkins, the former Simonyi Professor of Public Understanding of Science at Oxford (1995-2008). His Richard Dawkins Foundation for Reason and Science, established in 2006 and merged with the Centre for Inquiry in 2016, has nearly 400,000 YouTube subscribers and almost 50 million views. Dawkins' most viewed content relates to science versus Abrahamic faith traditions.[39] In his 1996 Humanist of the Year acceptance speech, Dawkins stated, "I think a case can be made that faith is one of the world's great evils…science is not religion, and it doesn't just come down to faith. Although it has many of religion's virtues, it has none of its vices" (January/February 1997 issue of The Humanist [Vol. 57, No. 1]). He spent his career combating the "God Delusion" by attacking the institution he saw as responsible for science illiteracy.

However, around the 1980s, the Deficit Model came under scrutiny. Critics argued this approach was simplistic, failing to account for complex factors influencing public attitudes: audience beliefs influenced by religious, spiritual, and cultural backgrounds, socio-demographics, the source and medium of communication, and the socio-cultural environment (Koswatta, Wingenbach and Leggette 2022). Public resistance can stem from deeper values, beliefs, and identity issues rather than a lack of information (Wynne 1992). Numerous studies show that merely increasing science knowledge does not change beliefs or behaviours (Sturgis and Allum 2004, Allum et al. 2008, Nisbet and Scheufele 2009, Kahan 2015). The model has been criticized for its restricted, top-down flow from expert to layperson, being

[39] My use here of "versus" is deliberate as Dawkins is, playfully and simultaneously condescendingly, referred to as one of the "Four Horsemen of New Atheism" after a 2007 unmoderated discussion with Dawkins, Christopher Hitchens, Sam Harris, and Daniel Dennett that was titled "The Four Horsemen" was released. Dawkins spent much of his time in public discussions critical of religion, a position that landed him in numerous controversies. He also maintains an active engagement on X (formally Twitter) where he has over three million followers and uses it to promote his organizations, events, and to engage with people directly, often enforcing conflict myth stereotypes.

paternalistic and not valuing public knowledge (Nisbet & Scheufele 2009; Dudo & Besley 2016). It overemphasizes expertise in ways that may implicitly assume that scientists' worldview dominates other forms of knowledge (Jasanoff 2011). However, some in science journalism argue the Deficit Model still has a role today.

Communicating accurate scientific knowledge is essential for developing effective policies and empowering governments, NGOs, and industry through authoritative information (Sturgis and Allum 2004; "The case for a 'deficit model' of science communication" 2005). "The process of democratic dialogue over science and technology-based issues is critical to the effective functioning of modern societies. But providing reliable information in an accessible way—in other words, filling the relevant 'knowledge deficit'—is an essential prerequisite of both healthy dialogue and effective decision-making" (The case for a 'deficit model' of science communication 2005).

The Contextual Model

Unlike the Deficit Model, the Contextual Model emphasizes understanding the specific contexts in which science communication occurs, considering factors such as cultural background, socio-economic status, and personal experiences that shape how individuals interpret scientific information (Gross 1994). This model's attentiveness to personal psychological dispositions and cultural schemas aims to advance equitable communication. Lewenstein offers health communication as an example, specifically doctor-patient interactions (2003). The COVID-19 pandemic underscores this: vaccine rollout was hotly debated and divisive, with large demonstrations across the North Atlantic world concerning vaccine hesitancy and political distrust (Rosenbaum 2021).

Such events underscore the need for science communication to be more reflexive and adaptable to particular scenarios. Adaptability to personal or community identities may

enable science to reach audiences with preexisting biases. For example, a Contextual Model may allow communicators to engage directly with Christian faith groups if the communicator were themselves Christian, thereby engaging more closely by being part of the community. The same applies to Muslim and Jewish groups. This addresses concerns about the Deficit Model by altering the dynamic between communicator and audience. There is less emphasis on expertise and absolute knowledge, and more on addressing the complex arrangement of conditions for communication. Similarly, there is less emphasis on audiences being "scientifically illiterate" needing to "fill the gap." Groups are perceived through complex contextual factors, and communication modes are adapted to specific, targeted needs. Science is communicated for engagement on particular issues rather than to educate generally, employing a targeted approach rather than a broad one. This is why the Contextual Model is often utilized in health-related campaigns (Lewenstein 2003: 3-4).

Paradoxically, the Contextual Model's strength in accounting for diverse influences is also a critical challenge. The complexity of considering numerous contextual factors makes practical application challenging, resulting in uneven communication varying by location, presenters, and funding (Fischhoff 2013). Small teams work on science communication for groups and projects, and it is impractical to develop strategies sufficiently adaptable to diverse populations with varying interests, backgrounds, and levels of education. This presents challenges for development processes and funding needed to reach broad populations effectively. Science communication teams are often tied to funding models. The American Association for the Advancement of Science reported spending $47,983,000 USD on "Policy, education and other programmes" in their 2023 Operating Budget (AAAS 2023). If divided equally, that leaves almost $16 million. In the United States, where cultural fragmentation across political, geographic, and historical contexts is significant, these dollars

for nearly 340 million people would not spread far, making regionally staffed developments very challenging.

Another criticism, similarly aimed at the Deficit Model, is that the contextual model also vests power in scientists. This remains a one-directional communication process with little interaction between source and recipient (Brossard and Lewenstein 2010). Science in this model, and often enough in the media texts of science popularization, is presented as knowledge from epistemically justified positions from those with the skills, training, and expertise to arrive at trusted accounts. The "Black Box" of science, formulated by Bruno Latour in *Science in Action* (1987), is an apt formalization of this criticism. Science is presented within an environmental context based on in-house research by communications teams and therefore remains hidden behind a black box. The audience, while considered more, does not engage in scientific processes, contribute to knowledge production, or act much more than an information receiver. This model doesn't provide space for local understandings and practices to be considered alongside scientists' work. This may be off-putting, exclusionary, and present a view of science that leans on undesirable political trends, such as colonial dominance or exploitation.

The Lay Expertise Model

In recognition of the Contextual Model's final criticism, the Lay Expertise Model acknowledges that contributions may stem from non-scientists, enriching scientific discourse through local, indigenous, and experiential understandings. Science communication has traditionally relied on a top-down approach in which scientists disseminate information to a passive public, even when the audience and setting are taken into account (Bucchi 2008). Meaningful engagement, proponents claim, can be achieved if discussions encourage cooperation and the acceptance of methods and understandings from local peoples,

contributing to shared, participatory knowledge development (Brossard and Lewenstein 2010).

According to Collins and Evans (2002), lay expertise "comes from experience and is not certified by formal qualifications" (236). Brossard and Lewenstein (2010) agree, noting most of humanity survived based on "lives and histories of real communities" (15). Recent history of science corroborates this, showing how scientific knowledge was made possible through indigenous and local expertise, especially in botany and biology during the 18th and 19th centuries (Bil 2018; Bossoh 2025). Acknowledging lay experts' contributions recognizes that scientists can gain important insights they might otherwise miss or risk overreaching. This has become a sensitive topic in postcolonial scholarship and STS work, entering the discourse of science communication.

The Lay Expertise Model makes science a collaborative process in which communication is a two-way exchange of expertise—a method of engagement, equality, and acceptance. Knowledge is shared between groups in a mutually enriching process, making it more rigorous and open. An important aspect is democratizing science and opening the black box of science. The model democratizes science by breaking down hierarchical structures that separate experts from non-experts (Brossard and Lewenstein 2010), ensuring that diverse perspectives enhance the legitimacy and acceptance of scientific findings and policies. It recognizes the value of public participation in scientific decision-making, flattening power structures of expertise—encompassing naming conventions, research funding allocation, testing locations, sample allowances, and other aspects —promoting a more inclusive, democratic approach (Irwin 1995).

Another advantage is alleviating public skepticism towards science and scientific institutions, which has become increasingly apparent in the social media age (Mede 2022; Zimdars et al. 2024). Mistrust of experts and those outside one's social circles can hinder

acceptance of scientific information. Through citizen participation in science governance and extended peer review involving local stakeholders, greater accountability can address crises of confidence between science and society (Jasanoff 2003). When people see community members discussing familiar topics—reflecting lived experiences and understandings—acknowledged alongside scientific knowledge, they are more likely to trust scientific findings. Lay experts are often critical of outsiders because local leaders provide contextualized understandings that outsiders cannot access. They act as interpreters for both communities and scientists, providing context for the scientific knowledge being communicated, elevating social and cultural factors, making science fluent for locals or making local customs fluent for scientists (Fischer 2000; Nowotny, Scott & Gibbons 2001).

Despite possibilities, this model has critical weaknesses. One concern is the potential introduction of misinformation into scientific discussions. Lay contributions, while well-intentioned, may be based on misconceptions or lack scientific rigour (Brossard and Lewenstein 2010). For example, the COVID-19 pandemic revealed the perils of unchecked skepticism toward scientific expertise, as developing and changing public health recommendations were misinterpreted as incompetence, thereby creating interpretive voids rapidly occupied by proliferating non-expert (mis)information and undermining adherence to evidence-based measures. This exacerbated preexisting political polarization and eroded trust in what ought to have been authoritative institutions, fostering an environment where non-expert disinformation thrived on social media platforms and hindered effective public health responses. This leads to another worry, which this model has been criticized for: privileging local knowledge over scientific knowledge and being driven by political commitments to community empowerment rather than empirical inquiry (Brossard & Lewenstein 2010). This prioritization of experiential learning over systematic scientific methods raises concerns about the epistemological foundations of lay contributions. Assessing lay expertise credibility

is challenging, especially regarding minority groups. Scientists may struggle to determine which contributions are reliable when they conflict with established scientific knowledge (Wynne 1992).

Moreover, incorporating lay expertise requires significant time and resources. Engaging through meetings, workshops, and dialogue demands commitment from scientists already constrained by obligations. Funding is crucial to reach wider, diverse communities. Finding relevant local experts can be particularly challenging, requiring additional time, money, and effort. Additionally, integrating lay expertise can lead to conflicts between scientific knowledge and local understandings. Differing worldviews may lead to disagreements that are difficult to reconcile, hindering progress and diminishing the effectiveness of communication (Wynne 2006). Critically, it is essential to recognize what constitutes knowledge—a claim where science holds greater authority over competing claims. While power relations, history, and economics should be considered to address tensions, they should not divert from science's task. Given these challenges, it is imperative to develop strategies to mitigate risks associated with the Lay Expertise Model.

The Participation Model

The Participation Model, also known as the Participatory Model, builds on the principles of the Dialogue Model (to be discussed shortly) and the Lay Expertise Model, but goes further by actively involving the public in the scientific process. Proponents encourage citizens to participate in scientific research, decision-making, and policy development, while urging scientists to involve the public, giving members an active role in scientific processes. Like previous models, the aim is to democratize science by making it more inclusive and responsive to societal needs while educating the public on how science operates and the

practices required to conduct it. This model has made significant contributions to policy over the last two decades.

One primary strength is its ability to foster mutual understanding between scientists and the public. By promoting two-way communication, this model enables more equitable exchanges of insights, concerns, and values. According to Bucchi (2008), interactive communication—involving audiences in the laboratory—leads to a more nuanced understanding of scientific issues, as it incorporates public experiences alongside scientific practices and expertise. This mutual exchange enriches communication, enhances trust, and makes scientific information more accessible and relevant to non-expert audiences by providing a tactile, instructional experience of scientific practice. Public skepticism toward scientific institutions often stems from a perceived lack of transparency and inclusion. Much of the COVID-19 pandemic was spent adjusting to rapidly changing viral dynamics, making research and reporting difficult, affecting perceptions of transparency, and leading to conspiracy theories (Caulfield et al. 2021). Brian Wynne (2006) argues that genuine public engagement with scientists and science practices is needed to build and restore trust. When individuals feel their voices are heard, their contributions valued, and the science black box opened, they are more likely to trust scientific processes and outcomes. This trust is crucial for public acceptance of scientific policies and research developments.

Like the Lay Expertise Model, the Participatory Model democratizes science by involving broader stakeholders in the communication process. Participatory approaches break down barriers between experts and laypersons, promoting inclusivity and shared decision-making. This ensures scientific endeavours are not solely directed by select experts but shaped by collective public input. By acknowledging the legitimacy of diverse perspectives and bringing stakeholders into dialogue and practice alongside experts, the Participatory Model brings scientific pursuits closer to societal needs and ethical considerations, making

science more tangible and trustworthy. This has repercussions for improving science policy outcomes, another strength. Policies informed by public engagement are more likely to be effective and publicly accepted. Rowe and Frewer (2000) provide a framework for evaluating public participation methods, identifying acceptance and process criteria to assess the quality and effectiveness of different approaches. For instance, involving communities in environmental policymaking can yield strategies that are both sustainable and culturally sensitive, thereby enhancing implementation and success.

However, Alan Irwin (2006) critically examines claims that participatory approaches in scientific governance break down barriers between experts and laypersons, questioning whether such mechanisms genuinely promote inclusivity and shared decision-making as advocates suggest. Implementing participatory approaches requires considerable time, money, and human resource investments to support necessary public involvement (Irwin 2006). To have a notable impact, it requires that as many people as possible have access to scientists willing to open up and communicate their work, engaging and including audiences in research. This incurs significant capital costs and requires substantial time from scientists, potentially detracting from critical research. Furthermore, the diversity of groups and communities poses challenges for engaging diverse publics with varying interests, knowledge levels, and values. Traditional approaches often adopt fixed, normative models emphasizing representation and inclusivity. Yet, Chilvers and Kearnes (2016) critique these representational perspectives, arguing they inadequately address the impossibility of involving all relevant stakeholders within a single participatory exercise, and call instead for recognition of “ecologies of participation.” Furthermore, Fiorino (1990) notes that participatory processes may be undertaken for instrumental reasons—to increase policy legitimacy—rather than solely for normative democratic ideals, raising questions about the genuine influence of public input.

The Dialogue Model

A fifth, contemporary model has emerged in the digital media era. The Dialogue Model emerged in response to the Deficit Model's limitations and to the challenges posed by the other three models. Here, emphasis lies on two-way communication between scientists and the public to contextualize information and make it relevant to community or audience needs, using digital platforms to enhance accessibility of science communication to broader audiences. This model is grounded in engagement and interaction between experts and laypersons, in which both parties contribute by exchanging perspectives and questions. Many popular science communicators and practicing scientists have adopted this approach.

Neil deGrasse Tyson hosts the *StarTalk Radio Show* podcast and the television programme, both of which employ this method. Tyson, an astrophysicist and director of the Hayden Planetarium at the American Museum of Natural History, serves as host alongside a comedian and a guest, often a practicing scientist but occasionally a celebrity. The programme discusses science in terms of filling knowledge gaps but also in the context of broader implications. Science is presented in an accessible way, designed to stimulate and entertain while promoting the idea that a science-educated public fosters a flourishing society. The show's description notes: "We explore captivating subjects such as space travel, extra-terrestrial life, the Big Bang, the role science plays in people's lives, the future of our Earth and the environment, the science behind the most iconic sports plays in history, and breaking news from the universe" (StarTalk 2024).

On YouTube, *Big Bang Theory* star Dr. Mayim Bialik uses her neuroscience background to host a channel dedicated to mental well-being, gathering nearly 2 million subscribers and combining Participatory and Contextual models.[40] Dr. Becky Smethurst, an astrophysicist who posts weekly videos on the universe, has almost 1 million subscribers and

[40] Dr. Bialik holds a PhD in neuroscience from UCLA. https://www.youtube.com/@MayimBialik

combines Contextual and Participatory models. All these communicators combine elements from the four models to varying degrees. Being an accessible source of scientific knowledge on platforms like YouTube, Tyson, Bialik, and others fills the knowledge gap left by the Deficit Model while simultaneously engaging with people and ideas through interview formats with guests or audiences who can ask questions or participate in demonstrations.

The Dialogue Model is also open to knowledge from varied sources, approaching each proposition with scientific tools. One area of interest is the intersection of science and faith, using scientific disciplines and methods from psychology or evolutionary anthropology to examine, for instance, the mechanisms by which faith operates, given evolutionary accounts of human social bonds (Dein 2020). Another example leverages computer science and programming to understand how AI technologies would impact spiritual guidance and faith-based practices (Dorobantu 2024).[41] Science is harnessed to explore propositions of other knowledge systems, enabling more respectful, open dialogue among practitioners and the public.

While the Dialogue Model promotes mutual learning and understanding and is considered one of the most effective models available, its practical implementation can be challenging (Metcalfe 2022). Effective dialogue requires time, resources, and commitment from both scientists and the public (Davies 2008). The most critical resource challenge is funding, as this model is costly. Tyson, Bialik, and Smethurst are in positions where funding is not an issue. Tyson, a science communicator on television since 2006 on PBS's *NOVA*, later hosted the two newest *Cosmos* series, and is widely known with significant cultural capital. *StarTalk* began in 2009 as an audio podcast and has since expanded to a YouTube

[41] Note here that this model reflects closely the dialogue model from Ian Barbour's four typologies detailed in Chapter One. This may have much to do with the intersection of science and culture, of which religion is no doubt a significant contributor, whether as a historical precedent or active contributor.

video format, with 3.67 million subscribers, 1,289 videos, and over 524 million views. Tyson, a self-described "personal astrophysicist," has become a household name. His role as Director of the Hayden Planetarium supports and strengthens his platforms. Bialik was a notable television actor in *The Big Bang Theory* (2007-2019), and Oxford University directly supports Smethurst's channel. Their positions make their roles more accessible, and their support and fame amplify their reach.

Related to financial challenges are power imbalances in economic matters and the inherent imbalance between scientists and the public. Some critics argue that genuine dialogue is challenging because scientists may still dominate conversations, resulting in unequal exchange (Brossard & Lewenstein 2010). Scientists are experts with specialized knowledge and unique "language games" that make it difficult for laypersons to access. In some ways, this may make communication less two-way than intended, especially if communication skills are less suited to conveying complex, abstract ideas. The dialogue model may suit specific contexts, such as local community engagements or policy discussions; still, as this section has shown, while popular and the de facto model for many communicators with social media and digital channels, it may be a less practical option for broad public communication campaigns with specific messaging or intentions.

Cosmos as Science Communication and Popular Culture

While I have been arguing that the *Cosmos* series defines a new genre of narrative form situated at the crossroads of science and religion, it is nonetheless a programme of science communication and popularization. Similar to the Complexity Principle in Science and Religion, *Cosmos* is also a complex array of intersections between models of science communication and forms of popularization. I claim that *Cosmos* occupies a hybrid zone of models, having points of intersection with four of the models of science communication I

outlined above. *Cosmos* also, crucially, popularizes science. This aspect of *Cosmos* is intertwined with the narrative messaging I am drawing out, which I argue is more meaningful and culturally and historically significant than first appearances suggest. In this section, I will draw out the contents of this chapter in reference to *Cosmos* before continuing onto the final two topics of this chapter—popular culture and rhetoric—before concluding with one last content analysis of *Cosmos*, looking at the final episode, number thirteen, from both *A Personal Voyage* and *A Spacetime Odyssey* to further substantiate my position in reference to the topics of this chapter.

The first model that *Cosmos* embraces in its presentation of science is, without doubt, the Deficit Model, as it is explanatory from the scientist to the audience. Here, there is no opportunity for a two-way conversation as the television medium does not allow it, thereby eliminating the possibility of the Participation Model. The science is presented to the audience, in certain respects, to fill the knowledge gap that the education system may have failed to "fill." As I detailed in Chapter One, Sagan and Druyan were keen to address the shortcomings of the current state of science education in the United States, suggesting that their work was partly motivated by the need to educate the public by filling gaps left by other media of science education. Sagan was quite keen on pursuing this line of thinking, spending much time in the public eye doing so, committing his stance to paper in *The Demon-Haunted World: Science as a Candle in the Dark* (1995), where he outlined his now fairly influential "baloney detection kit" to provide the reader, and thereby the American and reading public, with the means to "construct, and to understand, a reasoned argument and—especially important—to recognize a fallacious or fraudulent argument" (210).

Cosmos also adopts elements of the Contextual Model, as the programme's development by Sagan and Druyan, in light of the need to educate the public, was designed to speak to the world. By this, I mean that *Cosmos* is inclusive in its approach to storytelling,

utilizing the myths, legends, and stories of many cultures worldwide to tell the story of human beings, life, the universe, and science. While science is presented as the source of knowledge about the natural world, careful attention is devoted to using stories and artistic and musical themes from across cultures and eras that reflect the diversity and beauty of human reflection on the natural world. Furthermore, this model, designed for television, utilizes cutting-edge digital effects technologies from Hollywood visual effects studios, a grandiose, sweeping score from renowned composers, and an array of recognized voice talent from both silver and small-screen actors.

While seemingly most removed from the Lay-Expertise Model and the Participatory Model, I would argue that the 'call to science' that opens inquiry, imagination, and skepticism to all that *Cosmos* inspires is, in effect, an opening to the possibilities these models allow. In revealing the universe as knowable and as deeply connected to us, *Cosmos* attempts to bind the viewer to what I detailed in Chapter Three as mystery as an epistemic condition—the ever-receding frontier of what science has yet to disclose—while simultaneously producing enchantment of the revealed through the knowledge it does convey. The script pays careful attention to the framing of aspects of the natural world that current science cannot yet detail. *Cosmos* frames these as questions, as problems to be solved by new generations of scientists, as not yets. In fact, Sagan is credited with inspiring many prominent scientists to pursue a career in science. It seems that as part of the ritual of 'Carl Sagan Day', the 9th of November of each year (Sagan's birthday), groups of scientists, reflecting on Sagan's contributions to science, education, and outreach, reveal his influence on their own career paths, often noting *Cosmos* as a first introduction.[42]

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[42] For example, see the US National Nuclear Security Administration's 2016 blog post (https://www.energy.gov/nnsa/articles/carl-sagan-continues-inspire-nnsas-scientists), or Bill Nye discussing how Sagan inspired his own career in science popularization in 2014 (https://www.theverge.com/2014/3/23/5539846/steve-martin-carl-sagan-bill-nye-science-guy).

I would argue that *Cosmos* also leans on the Lay Expertise Model to the extent that the stories of the world, the ways of knowing that have been, either directly or indirectly, carried by the multitude of cultures and societies around the world are, as I have argued throughout this work, proudly on display as part of the human experience that are themselves part of the Grand Cosmic Narrative. In Chapter Two, for example, I detailed how Sagan utilized the story of the Battle of Dan-no-ura to give definition to the story Sagan told of artificial selection. Further, in Chapter Three, Tyson explains with respect and care the many cultural creations and imaginings, from around the world, of constellations in the night sky and the many meanings derived from them. While not directly knowledge related to science *per se*, the inclusion in every episode of *Cosmos* of cultures and stories from around the world does much work in revealing that *Cosmos* is not making claims as to who is right or wrong, but the many ways in which we all have conducted our own experiments, our own classifications, and our own stories that point towards similar ends: knowing our world through meaningful engagement. In this sense, the many lay people around the world over thousands of generations are all participating in the Grand Cosmic Narrative that *Cosmos* presents.

Finally, the Dialogue Model is probably the most obvious and most effective in capturing the framework that the *Cosmos* series is utilizing. It is in the very title of the original 1980s series—*A Personal Voyage*. The more direct approach to science communication, with Sagan often close to the camera, filling the viewer's screen, was influential in establishing a more intimate connection with Sagan and, by extension, with science. His use of personal pronouns and inviting language inspires trust and encourages participation in answering, or attempting to answer, the questions presented to the viewer. This model is further reflected in how *Cosmos* bridges the gap between the natural world that science investigates and the diverse cultures of the world, their rich histories, and their

captivating stories. Bringing these two seemingly separate realms together (the natural and cultural worlds) puts them in dialogue, enhancing viewers' appreciation for the peoples and places of the world and allowing connections to be drawn between the universe at large and the diversity of being here on planet Earth.

Sagan spent decades communicating science in as many popular formats as he could, many of which I detailed in Chapter One. The incredible popularity of *Cosmos* and the legacy of Carl Sagan have cemented them in the lexicon of science popularization, making them household names across diverse social and popular contexts. The work has made Sagan and *Cosmos* so popular that they often appear directly or in reference in popular culture to this day. For example, *Family Guy* (2005-) has made numerous references to *Cosmos* and Carl Sagan throughout its run,[43] and the first season of the widely popular Netflix programme *Stranger Things* (2016-) has a plot point pivot on something a character learns in *Cosmos*.[44] This cultural visibility is significant, but we must proceed carefully to distinguish between recognition and influence. That millions of people can identify Carl Sagan does not, in itself, tell us whether those same people have absorbed the GCN's deeper claims about the relationship between science, religion, and meaning. As I shall address directly in the concluding chapter, the persistence of the conflict thesis at the macro-sociological level suggests that cultural recognition and worldview formation operate on different registers, a distinction that is central to understanding both the GCN's achievements and its limitations. As such, we need to engage, albeit only briefly, with popular culture as a social structure of significance for our discussion on *Cosmos*, as it is the medium which keeps Sagan and *Cosmos* firmly in the lives of those living in the present.

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[43] An example of Sagan appearing in *Family Guy*: https://youtu.be/Ljt5iESYA7k?si=up9pYtEy2-vK1PC-

[44] One of the scenes in *Stranger Things* where characters need to learn more about what Carl Sagan communicated to them in *Cosmos*: https://youtu.be/iLu8ykvfuNw?si=s1S4_n6v9H5CQUmX

Popular Culture

In Chapter One, I spent time detailing the series *Cosmos* and revealed that it has been viewed an estimated 1 billion times. This staggering number is unparalleled compared to virtually any other long-form science communication/popularization programming. There are many reasons why a text may become popular, but we can acknowledge here that *Cosmos* is certainly a text of popular culture, as it occupies a recognizable position in the cultural lexicon, referenced in television, film, and online discourse with a frequency that, I assert, confirms its status as a known cultural entity, even if the depth and nature of that recognition vary considerably across different audiences and demographics. But what is popular culture? How do we differentiate something as a part of culture from that of popular culture? Is it even fair to make a distinction? These are difficult questions, and the answers vary depending on who is asked and their field/discipline/background. In this section, I will spend a little time doing just that—unpacking popular culture in light of our goals for this work.

Popular culture is a broad term, often associated with textual forms, that conveys information to viewers. The information in question is widely varied and could include, for example, entertainment and leisure like theatre, dance, music, and comedy shows; fashion and trends like those from magazines and clothing brand advertisements; cultural norms, like behaviours and roles; media objects like film, comic books, television programmes, novels; and linguistic conventions arising from digital platforms like TikTok or Instagram, among a wide range of other objects—the list is virtually limitless. Given this wide range of textual objects, popular culture serves as a vast meeting place for practices, beliefs, ideas, values, perceptions, arts, people, and objects that embody the most broadly shared meanings of a community. Popular culture, therefore, can act as a reflection of a society's attitudes and values at a macro scale, and of a community at the micro scale, and due to the popularity and mass appeal of these texts, they usually adopt cultural movements more quickly than society

at large. This delineation underscores the classic trio of cultural forms—high or elite culture, popular culture, and folk culture—wherein high culture embodies elite, institutionally sanctioned artistic achievements, folk culture preserves localized, traditional practices, and popular culture bridges the two through mass-mediated appeal, especially in media contexts where these boundaries often blur and hybridize. While this framework provides a foundational lens for analyzing media's role in cultural dynamics, contemporary critiques highlight its limitations in accounting for globalization and digital convergence, which erode rigid hierarchies and empower hybrid expressions (Jenkins 2006). Popular culture, then, being associated with either mass culture or folk culture, is in contrast to high culture and various institutional cultures, such as legal culture, political culture, etc., which are slower to adopt new cultural views and ideological positions given their entrenched, bureaucratic systems of practice (Kidd, Kim and Turner 2017).

Because popular culture is often synonymous with mass culture, it tends to be understood as embedded within capitalist systems of economic production (Fiske 2010; Malinowska and Lebek 2016). This association has a substantial critical genealogy. Adorno and Horkheimer (2002) argued that the "culture industry" standardizes cultural output to serve capitalist imperatives, producing commodities designed to maintain the ideological status quo. On this account, popular culture is something done to audiences rather than something made by them. Fiske (2010), however, complicates this picture by identifying a fundamental tension within popular culture's commodity status: popular culture circulates as a set of commodities, like big-budget Hollywood films, collectors' action figures, and ready-to-paint Dungeons and Dragons set pieces, produced through profit-driven processes and sold to consumers. Yet the culture that audiences make from these commodities frequently resists the very logic of production that created them. This is consonant with what de Certeau (1984) describes as the "tactics" of everyday practice in the ways in which people repurpose and

redirect the products of dominant systems toward ends those systems did not intend. Popular culture is, in this sense, both mass-produced and popular, both commercially motivated and capable of carrying anti-establishment sentiments and diverse interests.[45]

The tension between popular culture's commodity status and its popular appropriation has led many scholars to focus on subcultures, like those of youth cultures, counter-cultures, and ethnic cultures, as sites where this friction becomes most visible (Hebdige 1979; Gelder 2005). Through a subcultural lens, popular culture is understood as a set of practices, performances, and objects that emerge within a particular group and, over time, circulate beyond it into broader cultural uptake. The trajectory of skateboarding in America illustrates this process. Rooted in the countercultural milieu of 1970s California, skateboarding operated for decades as a subcultural practice defined in part by its opposition to mainstream athletic and consumer norms (Borden 2001). By the mid-1990s, however, its cultural footprint had begun to expand through events like the inaugural X Games in 1995, the commercial success of the *Tony Hawk's Pro Skater* video game series beginning in 1999, and the growth of skateboarding-adjacent fashion brands until its incorporation as an Olympic sport at the 2020 Tokyo Games formalized what had been a gradual absorption into mainstream institutional structures. The very countercultural identity that defined skateboarding's subcultural appeal became, in Fiske's terms, a commodity to be produced, distributed, and sold.

This process of mainstream integration mirrors Dick Hebdige's resistance-incorporation model, in which skateboarding's subversive, working-class origins marked by DIY aesthetics and an anti-establishment ethos were gradually commodified through media and commerce, transforming a countercultural practice into a global spectacle. Yet, as Sarah

[45] Digital media platforms, such as YouTube, have many popular channels dedicated to this very intersection of establishment versus diversity of interest. While not always in good faith, some of these channels are motivated by contemporary political ideology being used as a narrative tool. For example, on YouTube, see @TheCriticalDrinker or @CriticalDiverseFemale, also @ContraPoints or @WisecrackEDU.

Thornton might argue, this evolution also highlights the role of subcultural capital, with insiders leveraging specialized tastes, such as obscure tricks, historical knowledge, and niche media (e.g., skate videos), to maintain hierarchies and authenticity even amid broader diffusion. Together, their frameworks reveal skateboarding not as a linear demise but a dynamic negotiation, where initial dissonance gives way to reflexive adaptations, though empirical data from post-2000 studies suggest this often reinforces rather than challenges underlying inequalities in access and representation. Holistic approaches to studying popular culture typically will examine how the collective creation of a subculture is appropriated by market forces. Critical challenges in the sociological and cultural analysis of popular culture include the representation of themes or groups in the content of cultural objects or practices, the role of cultural production as a form of social reproduction, and the extent to which audiences exercise agency in determining the meanings of the culture that they consume (Kidd, Kim and Turner 2017). This last aspect is especially important for us.

Of course, as a product of market forces, such as the need for funding, the dissemination of knowledge, and the collection of support, science popularization and communication can be viewed as texts of popular culture. What is interesting about the intersection of science and popular culture, however, is how little work has been done on this subject until the last two decades, and, as I have mentioned throughout this dissertation, even less when discussing the intersection of science, religion, and popular culture. Academic recognition of science as a rich site of intersection with popular culture, regardless of the practices already occurring at that intersection for over a century, began to take shape in the 1990s as scholars, mostly historians of science, began viewing science as *culturally situated* with members from all walks of life having access, of varying degrees, to the knowledge that science was beginning to disseminate, especially in the wake of cheaper mass printing (Cooter and Pumfrey 1994).

Some science popularization can reach heights of global recognition, becoming major "event" series or programmes that attract mass viewership and become part of the "canon" of popular culture. Sir David Attenborough's (1926-) *Planet* series, which includes, among many others, *Frozen Planet* (2011, 2022), *Green Planet* (2022), *Blue Planet* (2001, 2017), *Our Planet* (2019, 2023), and the flagship, *Planet Earth* (2006, 2016, 2023), have become staples of science popularization, particularly in the fields of biology and climatology, and is a prime example of science popularization having a significant impact on popular culture. Attenborough is a household name and his voice one of the most recognizable, endlessly parodied in comedies and other media content.[46] His long career in partnership with the BBC has not only pushed the frontier of what's possible for nature documentaries, a staple of science popularization and communication, but also in technical achievement. In fact, Attenborough is the only human being to have received BAFTA (British Academy of Film and Television Arts) awards across all television formats (black-and-white, colour, HD, 3D, and 4K). His example is instructive precisely because it demonstrates that science communication can produce cultural icons beyond *Cosmos*, but what distinguishes the GCN from Attenborough's work is not the scale of cultural recognition per se, but the nature of the narrative project: where Attenborough documents and celebrates the natural world, *Cosmos* constructs a comprehensive meaning-making framework—a grand narrative in the fullest sense—that explicitly engages questions of human purpose, cosmic significance, and the relationship between science and religion.

While there have been some concerns raised against nature documentaries, such as the vilification of some species (Muter et al. 2013; Somerville et al. 2021; Shiffman et al. 2022) and the impressive imagery used "which allows the audience to feel distanced and invincible

[46] His voice is so famous, in fact, that it is permanently clipped and saved on his locked Wikipedia page. There are also many clips on digital media platformers of impressionists and even illegal AI replicators of his voice.

to the impacts of climate change and biodiversity loss" (Nolan et al. 2022: 824), there is a growing library of scholarship arguing for the positive outcomes that nature documentaries have. For example, Grace Nolan et al. (2022), aside from their warning, conclude in their thematic analysis of BBC programmes *Blue Planet II* (2017) and *Seven Worlds, One Planet* (2019) that indeed audience engagement with nature conservation and climate change increased. Likewise, Julia Jones et al. (2019) come to a similar conclusion, stating "documentaries such as *Our Planet* help biodiversity and the pressure it faces gain a little more space in the minds of the citizens worldwide", urging for more research on the extent to which screen-based science communication/popularization through nature documentaries can assist climate change (Jones et al. 2019: 423).

That science popularization differs from science communication in some respects has only narrowed in the digital media age. Before, popularizing science would have been more aligned with popular culture, as demonstrated by the relatively limited work on the topic I highlighted above. Popularizing science through the models detailed in the previous section would have not only brought it into the public consciousness but also made it more accessible. Consequently, it would also have created opportunities for misinformation and disinformation, as the popularity and widespread dissemination, especially in mass-appeal products like film and television, made the possibility of error or intentional misrepresentation possible. This has happened for the sake of "entertainment", with films like *Armageddon* being a notable example that has received much chastising (Plait 2002). This reveals an interesting dynamic in which some gatekeepers call out the film's accuracy as a negative aspect of its direction, yet it remains, regardless, a work of fiction.

Interestingly, as David A Kirby has shown in his 2011 book, *Labcoats in Hollywood: Science, Scientists, and Cinema*, many films actually have practicing scientists as advisors. Even films that are criticized for their lack of scientific accuracy often contain some element

of advice. For example, in the 2003 film, *The Core*, directed by Jon Amiel and starring Aaron Eckhart and Hilary Swank, Earth is threatened by the sudden cessation of motion of the Earth's core, and so a team of scientists drill a craft to the planet's centre to plant and detonate a thermal nuclear warhead to restart the core's rotation.[47] The science in the film was panned as so inaccurate, to the extent that it topped worst movie lists and was cited as an egregious example of what Prof. Sidney -Perkowitz from Emory University called science being "out to lunch" (Kirby 2011, Sample 2010, Rozsa 2023). However, what is interesting here is that the science was advised by James Marvin Herndon, a geophysicist who suggested that the Earth's magnetic field was not generated by an iron-rich core but rather by a sustained nuclear fission reaction. This theory had been overwhelmingly rejected, but was indeed published in high-impact journals like the *Proceedings of the National Academies of Science* (*PNAS*) (Herndon 1996).

Here we see a scientist, Herndon, strategizing involvement in a Hollywood film because the screenwriters, Cooper Layne and John Rogers, used a premise similar enough that Herndon "sought out the makers…to offer his services" (Kirby 2011: 134). However, this also underscores the importance of narrative in popularizing science. The science, though backed by a practicing scientist and his proposed theory, was faulty because it made for a more interesting story. What is important to recognize here is that narrative plays a decisive role, but only if the story makes a meaningful impact on the audience. A story, however, requires that the linguistic strategies employed be meaningful and engaging and that they convey the necessary elements to engage an audience. This can often be seen as persuasive

[47] This already reveals itself as a laughably implausible situation, one which garnered much online criticism and many memes. See this subreddit: https://www.reddit.com/r/movies/comments/126sj2v/20_years_after_its_release_the_core_is_a/#:~:text=%22This%20is%20my%20Kung%2DFu,%E2%80%A2%203y%20ago

but empty, as is the case with *The Core*, which uses a widely dismissed theory. Here, we begin to see the importance of rhetoric in science communication and popularization.

Rhetoric and Science

Language is a critical aspect of communicating effectively in science. Consider Nolan's (2022) study of science documentaries mentioned earlier, such as those featuring Sir David Attenborough, which found that audiences were indeed motivated by the science narrated. Rhetoric provides a practical framework for understanding such communication. Andrea Lunsford notes that rhetoric has been viewed variously throughout history: as dialectic's "counterpart" (Aristotle), as "the art of speaking well" (Quintilian), as "the symbolic means of inducing cooperation in beings that by nature respond to symbols" (Burke 1969: 43), and as deceptive "hot air" (Plato, Locke, and others) (Lunsford, Wilson, and Eberly 2009: 14). While Aristotle defined rhetoric as "the faculty of observing in any given case the available means of persuasion" (Aristotle 2007: Part II), this definition grew increasingly diluted as the communications landscape changed and rhetorical applications proliferated after the field's renaissance in the 1970s (Lunsford, Wilson, and Eberly 2009: 16).

Rhetoric underwent this renaissance in the latter half of the 20th century after being relegated to academic obsolescence. Bringing Aristotle's treatise *Rhetoric* into focus, defined there as "the faculty of discovering the possible means of persuasion in reference to any subject whatsoever" (1.2.1), he introduced the three modes of persuasion that are used throughout rhetoric studies today—ethos, pathos, and logos. These are the fundamental analytical tools for examining, for example, the effectiveness of science communication and popularization. Ethos pertains to the speaker's credibility, pathos involves appealing to the audience's emotions, and logos focuses on logical argumentation. Their effective deployment, working in harmony, can significantly enhance the persuasive power of

scientific narratives, as exemplified by *Cosmos*. I contend this was precisely what Sagan and Druyan aimed for: fostering not only deeper public understanding but also meaningful appreciation and connection with their narrative. Ethos is particularly significant in science popularization, as the root of "ethic," referring to credibility and the appeal to the "why" behind one's decision (Walsh 2013). Scientists must balance presenting themselves as experts while remaining relatable. As Leah Ceccarelli discusses in *Shaping Science with Rhetoric* (2001), ethos construction involves both personal and professional attributes and institutional frameworks (166).

Pathos, the appeal to emotion, is crucial in popularizing the science narrative in the GCN and plays a role in scientific practice itself (Schaefer 2022). Kenneth Burke (1969) claims that pathos is achieved through 'sociality,' in which speakers demonstrate understanding of the audience's needs, values, and desires through metaphor, imagery, and visual media. Environmental communication exemplifies this; Matthew Goldberg notes that "emotions can potentially help generate long-lasting messaging effects…in part, in the evidence that emotions can affect the extent of thinking" (2023: 290). Logos—the appeal to logic—remains a cornerstone, deploying facts, statistics, and well-structured arguments (Holt & MacPherson 2010; Aho 1985; Green 2004). However, logos represents the appearance of rationality, akin to "common sense." As Professor Randy Allen Harris observes, scientists have a "dependence on logos" (1991: 297), believing "science is pure logos" (ibid.). This overreliance on rationality—expecting audiences to be persuaded solely by logic—can create barriers to public engagement.

However, in the 20th century, there was a resurgence of interest in rhetoric, now viewed not only as the art of persuasion but also as a theory of discourse and communication. Scholars broadened the scope of rhetoric by incorporating insights from psychology, sociology, and linguistics. This 'rhetoric turn', if I may, emphasized the social dimensions of

language, with scholars like Kenneth Burke's (1969) work standing out. Burke's concept of rhetoric as "symbolic action" highlights that language shapes human relationships and identities. His notion of "identification", which I referred to as sociality above, added depth to classical understandings of ethos, logos, and pathos by enhancing our comprehension of how persuasion functions within a diverse array of communities for reasons aligned with the needs of said communities.

Argumentation theory also emerged from this revival, notably through the work of Stephen Toulmin (1922-2009) and Chaïm Perelman and Lucie Olbrechts-Tyteca. Toulmin's *The Uses of Argument* (1958) has had a wide-ranging influence on fields such as critical thinking, rhetoric, speech communication, and computer science and artificial intelligence, extending beyond its original impact on philosophy. Toulmin challenged the dominant belief among Anglo-American philosophers that arguments could be entirely captured in formal, deductive terms, informing the development of "informal logic," which aimed to analyze arguments in everyday contexts, recognizing that deductive logic alone cannot encompass the full range of pragmatic elements involved in real-world argumentation. Perelman and Olbrechts-Tyteca also advanced a rhetoric-focused approach to argumentation in their work, *The New Rhetoric* (1969) (translated from *Traité de l'argumentation: La nouvelle rhétorique* [1958]), which argued that effective argumentation depends on persuading an audience and emphasizes the relative nature of adapting arguments to an audience. They distinguished between universal and particular audiences: every argument is for individuals and/or groups, while a universal audience represents a normative ideal with shared standards.

Today, with the introduction and broad adoption of mass media, rhetoric has expanded into visual and digital realms. Scholars of visual rhetoric examine how images convey arguments and influence viewers, a phenomenon that is particularly relevant in digital advertising, where images often persuade more effectively than words. Digital rhetoric

examines how online platforms transform communication, offering new tools such as digital ethnography. The social media landscape has witnessed the rapid dissemination of persuasive messages. The rise of misinformation and disinformation has also become a point of considerable interest, as social media platforms like Facebook, X, Instagram, TikTok and others have reshaped the media and text landscape. These new technologies have offered a rich resource for scholars of rhetoric as hundreds of millions of people, major corporations and political parties use social media platforms as sources of information and publication. For example, 55% of Americans get their news from social media platforms, with Instagram, Facebook, and X the most widely used, and TikTok the fastest-adopted, surpassing Facebook in 2024 (Pew Research Center 2024). Social Media has simultaneously reflected the scholarship on rhetoric in the 20th century, which began with its focus on social, cultural, and "informal" elements of argumentation, but has complicated traditional rhetorical analysis due to the fragmented and interactive nature of digital communication.

Rhetoric, I claim, is essential in any discussion regarding science communication and provides a vital framework for bridging the gap between complex scientific information and public understanding. Lynda Olman, Professor and Chair of English at the University of Nevada, Reno, has written on the "scientific-prophetic ethos of rhetoric" of scientists in her *Scientists as Prophets: A Rhetorical Genealogy* (2013), arguing that such rhetorical uses can have positive influences on science policy as political climates destabilize and become more embedded within technological and scientific aspects. It is crucial, Olman claims, that we recognize the "covenant values" that frame a crisis—i.e., those values shared by one polity that differentiate it from another—and how scientists, who are looked to for answers, adopt covenant values to shape their science communication. Olman traces the development of the scientific-prophetic ethos from its origins at Delphi to the Royal Society to the modern science popularizer. And while her work is particularly interested in the intersection of

science policy and its conflicts and crises with democratic processes, her work on the prophetic holds relevance for science communication more broadly. I will return to Olman's focus on the prophetic in my concluding chapter.

Olman demonstrates in the latter chapters, focusing on Hawking, Gould, and Sagan, that rhetoric engages the audience (or polity) through the use of and engagement with covenant values. The importance of rhetoric for audiences, emphasized to varying degrees across models of science communication, encompasses clarity, accessibility, and engagement, and aligns with shared cultural values. While it is the case that effective science communication breaks down abstract, complex scientific concepts for lay audiences without compromising accuracy, the rhetorical strategies employed are essential in constructing narratives that are informative and engaging, increasing the likelihood of public comprehension, trust, and even the affect of scientific knowledge. One of the most effective rhetorical tools to achieve this is narrative. Stories render scientific concepts more relatable by situating them in familiar contexts, thereby enhancing comprehension and retention. This approach aligns with Aristotelian pathos, utilizing emotion to foster curiosity and empathy. At the same time, ethos can be used to portray scientists as relatable protagonists, enhancing their credibility and encouraging audiences to trust their findings. Credibility, or ethos, is particularly significant in science communication, as trust is crucial for public engagement with scientific information. Establishing the authority of the speaker or institution is essential not only for trust but also for presence and, in the age of digital media, engagement. This is, as I will show later, an important component of the *Personal* in the title of Sagan's *Cosmos.* By using close camera angles, looking directly into the camera, and having the camera track Sagan's movements and facial reactions, the viewer is invited into an ethotic relation with Sagan, building trust and relatability.

Therefore, we have seen how scientists, as well as research projects, have leveraged social media and other digital platforms to connect, establish their credibility, and build ethos by clearly displaying their qualifications and engaging directly with relevant topics and audiences. Communicators and popularizers have employed strategies such as acknowledging uncertainties, differentiating established scientific knowledge from theory, and avoiding jargon that might alienate non-expert audiences, a process that Tyson's *StarTalk Radio* has been known for. While logos remains at the heart of science communication, emotional and ethical appeals have increased in importance, and it is here that the Grand Cosmic Narrative through *Cosmos* has made its mark.

Cosmos

To demonstrate how *Cosmos* adopts and adapts science communication models for its purposes, I will now present a content analysis of the final episode from both *Cosmos: A Personal Voyage*, titled "Who Speaks for Earth?", and *Cosmos: A Spacetime Odyssey*, "Unafraid of the Dark". I have selected the final episode from both, a fitting conclusion for the final content chapter of this project, as these episodes most reflect the narrative framing I have been writing about: the Cosmos and science as a meaningful pursuit and a purpose-providing endeavour. These episodes highlight significant differences in the presentation of science, hybridize communication models, and harness rhetorical and narrative forms, while emphasizing the importance of inquiry, stewardship, and collective responsibility. In this way, these final episodes provide a fitting conclusion to the aims of this chapter and the project, which I will outline as in the previous chapters.

Cosmos: A Personal Voyage

The title crawl for the thirteenth and final episode of APV is the only one in the series to extend past the point at which the episode's title, "Who Speaks for Earth?", is shown. Here, with the visual of flying through space, with stars of different colours, nebulae, and other cosmic objects, a voiceover begins. The voice is new, and what the voice utters strikes at the core of my project's thesis. Slightly modified from Deuteronomy 30:19-20, the voice says, "I call heaven and Earth to witness against you this day, that I have set before thee life and death, the blessing and the curse. Therefore, choose life that they mayest live, thou and thy seed" (01:01).[48] This biblical reference thematically reveals the aim of this episode, which will be the thread connecting the message of the episode; a warning of the dangers that face the world, especially from the Cold War.

Waves crash, and the camera fades and looks up toward the shore of a thickly forested cove. There, a small village with fires burning and a small number of people going about their business. Sagan's voiceover begins, telling us that 200 years ago, in the Gulf of Alaska, the Tlingit people had their first encounter with Europeans. The French explorer Jean-François de Galaup, comte de Lapérouse, arrived in the Gulf in July 1786 on "the most elaborately planned scientific voyage of the 18th century, sent around the world to gather knowledge about the geography, natural history, and peoples of distant lands" (02:34). But the Tlingit, having never seen a European sailing vessel before, saw it as a supernatural being, as they had "lived as their ancestors had for thousands of years." It is recorded that an old warrior was unafraid of the strange object on their shores and ventured out to discover,

[48] In the *New Oxford Annotated Bible* it is "I call heaven and earth to witness against you today that I have set before you life and death, blessings and curses. Choose life so that you and your descendants may live, loving the Lord your God, obeying him, and holding fast to him; for that means life to you and length of days, so that you may live in the land that the Lord swore to give to your ancestors, to Abraham, to Isaac, and to Jacob" (NRSV: 301-302). You can see the removal of reference to theos and biblical characters in *Cosmos*.

for the good of the village, what it was. The music begins to swell, ominous, foreshadowing the consequences of contact between the European and native tribes. “He went out on his own voyage of discovery to confront the end of the world” (03:33).

As this is a live-action scene, the visual and auditory drama make the story more compelling. As the old warrior heads out on a canoe to confront the strange object, the music swells with foreboding and tense tones from the orchestra, and the image of a wood-carved raven, the deity of the Tlingit, shifts between it and the bow of Lapérouse’s ship. The old warrior, however, upon approaching the vessel, and the camera showing the man inspecting and thoughtfully looking, decides that “it was not a great bird from the sky but the work of men like himself” (04:48). The ominous music stops. Sagan explains, “This first encounter turned out to be peaceful. The men of Lapérouse’s expedition were under strict orders to treat with respect any people they might discover—an exceptional policy for its time and after” (05:12).

To contrast the exceptional nature of this policy, the scene shifts, with the sounds of seagulls and ocean waves heard, accompanied by images of birds and waves crashing on the shore, followed by scenes of Spanish weapons and armour used during the Spanish conquest of present-day Mexico. Images from the Lienzo de Tlaxcala, a historical codex created in the 16th century (c. 1550), are also shown, detailing the slaughter of the Aztec and Tlaxcalan people from the Tlaxcalan perspective. Sounds of battle, swords clashing and men yelling and screaming are also heard during these visual sequences. “The Spanish, under Cortez, were not constrained by any injunctions against violence. Their true nature and intentions soon became clear” (05:52). Mass stores of real firearms from the 16th century are shown, and sounds of their gunfire are heard. The music, sad and lamenting, plays while Sagan morosely claims that “the Conquistadors sought not knowledge, but gold…In their madness, they obliterated a civilization” (06.27). In a “mockery of their religion, the Spaniards utterly

destroyed a society…equal of anything in Europe" (06:47), Sagan says before claiming that "we revile the Conquistadors for their cruelty and short-sightedness—for choosing death. We admire Lapérouse and the Tlingit for their courage and wisdom—for choosing life" (07:02), in reflection of the episode's opening.

This opening sequence reflects one of Cosmos's core narrative threads, which I have been eager to highlight in each episode analysis section of this project. While other science communication television programmes have told stories, *Cosmos* does so from the perspective of the world's rich diversity of cultures, drawing on morals derived from history and tradition, which are framed as akin to the methods of science that the show reveals. It is by telling a story of the people of the world and the universe at large that *Cosmos* tells its inclusive story, which, to the audience, is also their story. The opening sequence of "Who Speaks for Earth?" is a cautionary allegory for the Cold War's technological and political anxieties. In "choosing life", as the narration at the episode's beginning and Sagan tells us to do, Sagan and the writers are explicitly making a claim against the political stranglehold that the United States and the Soviet Union had on the people of planet Earth, and how close humanity was to "choosing death." They worry that "the choice is with us still, but the civilization now in jeopardy is all humanity" (07:10).

Once more walking along the Shores of the Cosmic Ocean, Sagan warns that humanity is a child of "the Earth and the sky," giving us a duality between different evolutionary traits. One side is "dangerous evolutionary baggage," like "ritual and submission to leaders," while the other has "compassion…and a desire to learn…and a great, soaring passionate intelligence—the clear tools for our continued survival and prosperity" (07:48). Sagan asserts that "up there in the Cosmos, an inescapable perspective awaits" where "national boundaries are not evident" and "fanatic, ethnic, or religious, or national identification" is "difficult to support" when viewing the earth from space as a "fragile blue

crescent fading to become an inconspicuous point of light against the bastion and citadel of the stars" (08:32). In all that vastness, "there are not yet obvious signs of extraterrestrial intelligence" which gives us no knowledge of whether intelligent life rushes "inevitably headlong to self-destruction" (08:44). At this, Sagan opens the following sequence of the episode, reliving his "dream about it, and sometimes they're bad dreams" (08:50).

A large wave crashes on the Cosmic Shore, and the image fades into the Ship of the Imagination sailing through the stars and heading towards a spiral galaxy that we know from the first episode is the Milky Way, our home galaxy. In lamenting tones, Sagan introduces his dream, imagining himself "searching for other civilizations out in the Cosmos" (09:09).[49] Sagan discusses the prospect of other intelligent life in our galaxy, making remarks that are reflective of the 1961 equation formulated by astrophysicist Frank Drake, which Sagan uses, albeit modified, later in the episode. In this reflection, Sagan comments that barren worlds would not have started life, while other worlds may be "rich in life" but not yet intelligent enough to achieve "high technology." Some worlds may once have had civilizations with high technology but "promptly use it to destroy themselves," and yet "perhaps there are also beings who learn to live with their technology and themselves, beings who endure and become citizens of the Cosmos" (09:59).

SotI flies through space, approaching a familiar-looking, inhabited world. The music, melancholy in tone, is Beethoven's Symphony No. 7's second movement—the Allegretto—one of the most well-known, celebrated, and debated pieces of Beethoven's compositions. The world fills the viewfinder, "encompassed by light" as Sagan looks on in hope, but "suddenly, darkness. Total and absolute" (10:42), and we see Sagan, stunned, lean back in

[49] Sagan was both active and public about the search for extraterrestrial life (SETI), much to the chagrin of other scientists of the time. The same year that *Cosmos* was released, Sagan, along with Bruce Murray (1931-2013), and Louis Friedman (1941-), founded the Planetary Society, whose three objectives are: Explore Worlds, Find Life, Defend Earth. Shortly after founding the Planetary Society, Sagan became active in collaborating with the

SotI's pilot chair, clearly in disbelief and shock. The inside of the ship turns a cold, dark blue as the planet in the viewfinder fades into darkness, only a blue crescent illuminated by the system's star, and SotI begins to fly away. Sagan pulls the suddenly dark planet up on the "book of worlds, a vast encyclopedia of a billion planets within the Milky Way" (10:58). We see different worlds flashing on a circular screen on Sagan's control panel he sits in front of, fictional identification numbers attached to each fictional world until he finds "this now darkened world" (11:21). Sagan taps the controls and text-based information begins to populate the screen, such as 'civilization type,' 'host star type,' 'planet age,' 'extraplanetary colonies,' 'species biology,' and so on. Sagan provides commentary on this data, as if reading it live for the first time, and lands on a page that has a 'probability of survival (per 100yr)', which is set at <1%, "not very good odds" (12:13), as the panel then flashes 'COMMUNICATIONS INTERRUPTED'. Sagan looks horrified and puzzled. He leans back, and we hear his voice, "They made the ultimate mistake" (12.20).

With this sad discovery, Sagan "felt a longing to return to Earth" (12:30), and SotI begins to accelerate forward. Sagan leans back in the chair, crossing his legs, settling in for the journey. Sounds start to play, "television transmissions from Earth," from oldest to newest, all from the Cold War. Then suddenly a voice says, 'please stand by' before silence falls, "total and absolute" (13:27). Swelling music begins to play from a full orchestra, Dmitri Shostakovich's "Symphony No. 5" (1937), widely regarded as a triumph of Soviet composition, its meaning has shifted from Soviet self-development under Stalin to the problems facing humanity at large, but has always reflected sad, emotive, and reflective themes (Sollertinsky 1980). Sagan paces back and forth in the ship anxiously, questioning impatiently what could have happened. Was it the destruction of the environment? A plague? The Earth appears in the viewfinder, and Sagan walks towards the "galactic computer" (14:49) and taps the screen. The details, like before, are shown on the circular screen,

revealing a probability of survival similar to that of the dead planet from earlier. "Communications interrupted" suddenly flashes and details populate below that reveal why this dismal phrase flashes on the screen, "So it was nuclear war. A full nuclear exchange…Never again would there be a love or a child" (16:12). The earth, the "Blue Marble" image taken by Apollo 17, shows on screen as Sagan says this, and the camera pulls out as Sagan stands in front of the viewfinder looking at Earth as he reflects on this terrible news. "We accepted the products of science. We rejected its methods" (17:04). The camera continues to pull back, and the SotI begins to darken so that only Sagan, standing in front of the image of Earth, alone and the last human being alive, is left distant to the viewer.

The Cold War was a period of immense political, economic, and cultural strain, marked by over 40 years of rivalry between the United States, the Soviet Union, and the many nations aligned with both. I have already detailed how Sagan spent much of the latter part of his career in the public sphere arguing against Cold War rationalities, with many of those events recorded and on YouTube. However, worth noting here is the framing of the episode's opening, which pits indigenous Alaskans and French explorers against those of the Spanish and the Aztecs. These starkly contrasting encounters represent the ethos of discovery and peace, as well as competition and destruction, with one being the obvious rational choice. This is the choice that "is with us still" Sagan referred to earlier. To maximize life, *Cosmos'* view and the narrative thrust of the Grand Cosmic Narrative is that we must choose curiosity, exploration, and the production and questioning of knowledge.

The dream sequence ends with a loud explosion, and footage of nuclear weapon detonations for testing is shown. Sagan's voice is heard before it fades to him walking towards the camera through a beautiful, peaceful garden, "every thinking person fears nuclear war, and every technological nation plans for it. Everyone knows its madness, and every country has an excuse" (18:00). The strings play soft, lamenting tones as Sagan continues,

"there's a dreary chain of causality" (18:05), and then details in simple terms the steps towards nuclear weapons beginning with the V2 rockets in Nazi Germany. Sagan sits on a dead, fallen-over tree trunk, and details how "all the death that rained from the skies" (19:09) during World War 2, every bomb dropped, amounted to no more than "a single thermonuclear bomb. One bomb!", he leans towards the camera, "with the destructive force of the second World War" (19:27). Sagan continues about the buildup of nuclear weapons, and the destruction that would follow in nuclear war, as images of the surrounding woods plants and trees and the sounds of birds. Sagan, visibly distraught, looks away from the camera after detailing the fallout of radiation and its effects, says any survivors would only be left with "the hopeless sense of a civilization destroyed for nothing with the knowledge that we could have prevented it but did not" (21:09).

We can appreciate here the concern about nuclear war, as Sagan is right to point out that "every thinking person fears" it and "everyone knows its madness", and this sequence continues for an additional five minutes of detailing that "madness". What is especially notable here, however, is that science communication/popularization has been absent throughout this episode so far. Instead, we have allegories and cautionary tales, details of a possible world that was a very real possibility in the 1980s. There is an appeal to "the better angels of our nature," as Abraham Lincoln stated in his first inaugural address. And here, as I have argued, that angel would be the tools of science, of rational discourse, of curiosity and skepticism. There is no theory or experiment of science on display; only the tools, laid bare, wielded to imagine a better future. Sagan concludes with hope: "a new consciousness is developing which sees the Earth as a single organism and recognizes that an organism at war with itself is doomed. We are one planet" (24:42).

The screen fades to the "Blue Marble" image, and Sagan describes our ability to now see the whole world as "finite and lonely" (24:50), which emphasizes that the world, bearing

the “entirety of the human species through the oceans of space and time” (24:59), is truly one. However, Sagan says, this perspective is not new. Returning to the recreation of the Great Library of Alexandria and Eratosthenes, Sagan reiterates the importance of this great monument and its many famous thinkers on the history of progress and knowledge. Sagan speculates that it was probably in Alexandria where the “true meaning” of the word ‘cosmopolitan’ was realized, of “a citizen not just of a nation, but of the Cosmos” (29:18).[50] Sagan looks up to the sky with a wondrous smile, “To be a citizen of the Cosmos” (29:23). He twists his head with a wry smile revealing his feelings on this long gone possibility.



Sagan’s wry smile as he details the cosmic perspective that was first possible in Alexandria in the 3rd century BCE (APV Ep. 13 - 29:23).

[50] Here we can refer back to the use of Cosmos from Episode One, detailed in Chapter Four, which, for the ancient Greeks was in contrast to Chaos, an ordered and knowable whole.

Sagan asks why these seeds of the modern world did not take root from the time of Eratosthenes, lying dormant for centuries? “I cannot give you a simple answer,” Sagan says standing in front of an open balcony with the famed Lighthouse of Alexandria in the background, “but I do know this…”, not “a single political, or economic, or religious assumption of the society” was challenged, “the permanence of the stars was questioned—the justice of slavery was not” (30:18). Here again we confront a very different kind of science popularization/communication, and a critical insight into the epistemic history of the North Atlantic world. I will return to this point in full in Chapter Six, but I want to draw attention to the ethical move made here. While unable to discuss such a serious matter with the audience, Sagan frames the question as if in dialogue with the viewer and invites the audience to reflect on the open-ended answer he provides. Sagan says that he “knows” that the cultural and societal conditions were not questioned, but the natural world was, creating the opportunity of doubt for any claim to ‘*this is just how things are*’ in the face of the collapse of the “greatest city the Western world had ever seen” (28:55).

Sagan walks away from the balcony, glancing at the large portrait on the wall before walking down some stairs. In a forewarning way, Sagan tells us that “learning in general was preserved for the privileged few” and what happened in the walls of the Library was lost on the “multitude”; it never “captured the imagination” of the people (31:30). He walks outside the Library to “tell you about the end” (32:14), about Hypatia and the fall of the Great Library of Alexandria. This part of the episode perpetuates a myth that emerged in the early 20th century and persisted into the late 20th century, including here in *Cosmos*. The myth is of Hypatia as a martyr for reason, knowledge, and science, killed at the sacking of the Great Library because the “growing Christian Church was consolidating its power” (33:35), and Hypatia and the Library represented “pagan influence and culture” (33:41). Accurately, Sagan details the political forces at play, including Hypatia’s proximity with the Roman

prefect, Orestes, who was politically embattled against the new Church's bishops, Theophilus and then Cyril. However, *Cosmos* frames the "fanatical mob of Cyril's followers" (34:27) as a Christian attack on reason and science.

This, of course, brings us back to our discussions throughout this work on the Complexity Principle from science and religion studies. The framing of Hypatia as a martyr for science and reason—a framing that Sagan's *Cosmos* itself powerfully reinforces—is not a comprehensive account of what we know, but rather the latest iteration of a polemical tradition that has reshaped Hypatia's image for centuries (Dzielska 1995). Hypatia was a Neoplatonist philosopher and mathematician who led a prominent school in Alexandria, attracting students from both pagan and Christian backgrounds. Her political influence derived not from any institutional position at the Great Library, as it had ceased to exist centuries before her birth (Bagnall 2002). Instead, it was derived from her role as a public intellectual and trusted adviser to the Roman prefect Orestes. It was this political association, amid an escalating rivalry between Orestes and Bishop Cyril of Alexandria over civic authority, that made Hypatia a target for the Christian mob detailed in the episode of *Cosmos.* Her murder in 415 CE by that mob of Christian parabalani was, as Watts (2017) argues, a contingent political act rather than a premeditated strike against pagan learning. This situation, like many throughout the engagement between science and religion, was driven by a complex array of cultural forces, and yet it is precisely the simplified version, in which religious fanaticism destroys enlightened inquiry, that has proved most narratively durable, and *Cosmos* draws upon it in constructing its account of the history of science.

However, as with the discussion on Giordano Bruno in Episode One of ASO, we could dismiss this inaccuracy uncharitably, or we can choose to see the message being conveyed, which we ought to. The Grand Cosmic Narrative adopts, to borrow from John F Haught's work, an "anticipatory approach…yet to be realized" as it is "still in the process of

becoming" (2017: 20). The answers of science are open to reoccupation, they are malleable and adaptable as the machinery of science is taken to secure epistemic authority, but the security is only maintained by its malleable adaptability; and when this is realized—authority follows. To be wrong is part of building knowledge, but to be open to questioning the "political, or economic, or religious assumption[s] of the society" is to embrace the Cosmic Perspective that the GCN encourages us to share.

The music, Adagio in G Minor for Strings and Organ, or "Albinoni's Adagio", by Tomaso Albinoni (1671-1751), is sad, with slow strings stirring while Sagan uses an analogy comparing the Library of Alexandria's destruction to a scenario in which Shakespeare's works were lost and only the titles—"Julius Caesar, King Lear, Romeo and Juliet" (26:24)—survived, giving the audience the reality of the 'incalculable' loss of the hundreds of thousands of texts the Library stored. Underscoring this entire sequence at the Great Library of Alexandria, Sagan tells us, "history is full of people who, out of fear or ignorance or a lust for power, have destroyed treasures of immeasurable value, which truly belonged to all of us" (36:48). Having told us "about the end" (32:14), Sagan now wants to "tell you a story about the beginning" (37:27).

An explosion on screen, "some fifteen billion years ago" (37:29), begins the concluding sequence of *Cosmos: A Personal Voyage*. The concluding 18 minutes of the episode can be divided into three acts: First, the "story from the beginning" is an account of Creation, from the Big Bang to the present moment, and includes many of the images covered throughout the series, ending with the animation of the one-celled organism to the human form seen in Episode Two, which I detailed in Chapter Two. The second act is a celebration of the gift of life, a celebration of the Grand Cosmic Narrative. It features many visuals of people from all across the world living their lives, socializing, working, being human, as well as the plants and animals that share this world, and the symbols of the world's

cultures that have been central to making sense of it all. Much of this part is modified and expanded upon in the first episode of ASO. The final act is reflections. Reflections on the journey to what we know that "required both an unflinching respect for the facts and a delight in the natural world" (44:29). More video from across the globe, along with the live action actors from throughout the series, are shown in rapid succession as the music of Ludwig von Beethoven's "Symphony No. 7, Movement 1" swells.

The music shifts to become more contemplative, a recording called "Cranes in Their Nest", a traditional unannotated piece from a Japanese Shakuhachi, a bamboo flute, included on the Voyager One Golden Record. Sagan says, we "long to be connected with our origins, so we create rituals (Sagan et al. 1978: 181). Science is another way to express this longing; it also connects us to our origins and, like religion, has its rituals and commandments. Its only sacred truth is that there are no sacred truths" (48:19). Sagan advises the ideal values of science here, which are repeated in short in Episode One of ASO as early video of rocket tests in black and white are shown. From these early tests, we have begun to explore the solar system as images of satellites and their imagery of other planets show on screen, "we have walked far" (52:12). The sequence ends with Sagan saying, "These are some of the things Hydrogen atoms do given fifteen billion years of cosmic evolution" (53:51).

The Shores of the Cosmic Ocean appear on screen one final time. Waves crash against the shore as Sagan says, "It has the sound of epic myth, but it is simply a description of the evolution of the Cosmos as revealed by science in our time. And we, we who embody the local eyes and ears and thoughts and feelings of the Cosmos, we've begun, at last, to wonder about our origins. Starstuff contemplating the stars" (54:19). Sagan picks up a dandelion seed, carefully between his fingers, "our loyalties are to the species and the planet. We speak for Earth" (54:43), he says, referring to the episode's title. "Our obligation to survive and flourish is owed not just to ourselves, but also to that Cosmos ancient and vast

from which we spring" (54:56), as he gazes to the sky before reaching out his arm and letting the dandelion seed fly free once again. The scene transitions to SotI flying through space, and we see no one inside, as if waiting for someone new to take us across knowledge and across the stars.

This closing sequence is the fullest expression of the GCN's rhetorical and enchanting machinery working in concert. Sagan's declaration that the evolution of the Cosmos "has the sound of epic myth, but it is simply a description...as revealed by science" operates as a deliberate rhetorical pivot: the logos of scientific description is acknowledged while the pathos of mythic resonance is preserved, and the ethos of Sagan himself, standing on the shore where the series began, holding the dandelion seed, binds the two together. In terms of the enchantment registers, all three converge: the mysteries that remain at the frontiers of science and human inquiry sustain enchantment of the unknown; the staggering narrative of the whole of cosmic evolution, "revealed by science in our time," constitutes enchantment of the revealed; and the ritualistic return to the shore, the dandelion, the invocation of loyalty to "the species and the planet," invests this scientific disclosure with the affective weight of sacred story, which is the enchantment of the narrative. It is this convergence that transforms a final episode of a television programme into the secular vision—I would even suggest the secular ethos—of the Grand Cosmic Narrative.



Sagan holds a dandelion seed before letting it go to conclude the final episode of *Cosmos: A Personal Voyage*. (Ep 13 - 54:57).

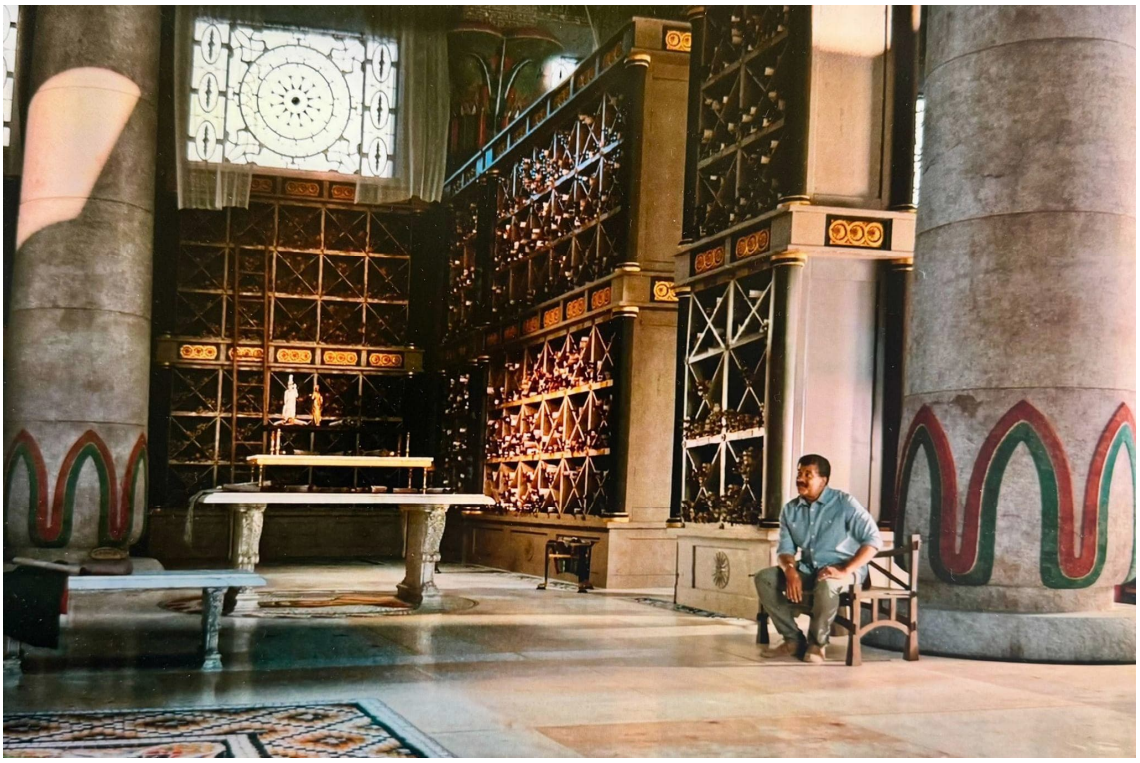
Cosmos: A Spacetime Odyssey

As I have demonstrated throughout the content analysis sections of each chapter in this dissertation, Tyson is, in effect, carrying the torch that Sagan lit in 1980. Olman's scientific-prophetic ethos, introduced earlier in this chapter, is on full display here: the science communicator as the figure who renders cosmic inquiry meaningful for the polity, mobilizing covenant values that bind the community to the values of inquiry, openness, and care for the planet. That Sagan left the ending of APV with SotI soaring through space, the chair empty, was symbolic of the openness that Sagan and the GCN have for the subsequent explorers, scientists, and wanderers to fill the seat. The conclusion to the original series was as much about the Cosmos as it was about the hope for humanity's future as caring, compassionate,

and curious. Tyson has taken us on a new, but familiar journey, filling the seat Sagan left and carrying the torch to this, the final episode of ASO.

The chords of strings build as the camera pans down, and a digital recreation of what the Pharos of Alexandria—the great Lighthouse that was one of the seven wonders of the ancient world—may have looked like is shown. A sweeping angle of the harbour where the lighthouse may have been is seen as Tyson's voice begins, "The dream of becoming a citizen of the Cosmos was born here" (00:26), a fitting intertextual echo with the final episode of APV 30 years earlier. The sun rises over Alexandria, and the recreated city becomes visible in the early morning light before we angle into the Great Library, with Tyson walking towards the camera inside.

"Rarely, if ever, before or since, has there been a government that was willing to spend so much of its gross national product on the acquisition of knowledge, and it paid off—big time" (01:02). Tyson walks deeper into the library, detailing some of the policies of the city enforced to build up the Library's collection. He walks towards a shelf of scrolls and reaches out to touch them, mentioning Eratosthenes, Pythagoras, Hypatia, and Euclid before taking out a scroll, examining it, and reflecting on the longevity of the works accomplished during the Library's time, which were certainly stored there. For example, the "Old Testament Bible comes down to us mainly from Greek translations made here" (02:00). He continues, "the total work-product of the awakening of ancient civilization—were kept here" (02:18). Estimates vary, he says, on the total texts stored at the Library, but all of it, he looks around the digital recreation of the Library waving his hand in gesture to what's around him, "is but a tiny fraction of the information that you have at your fingertips at this very moment" (02:37).



Tyson sits in the digital recreation of the Library of Alexandria, reflecting on the amount of information available at our fingertips right now versus the time of the height of the Library's power (ASO Ep.13 - 02:21).

The camera looks around the Library one last time before it zooms out to show the entire digitally recreated city of Alexandria as Tyson says that the "collective knowledge of our species, our own electronic Library of Alexandria, may be accessed by anyone who has a device and the interest and the freedom to do so" (02:51). Mirroring a theme of *Cosmos*, Tyson, like Sagan, highlights that "knowledge belonged to the elite" (02:56). In contrast, today in the North Atlantic world knowledge more or less belongs to everyone. But, like Sagan, Tyson too warns that if the knowledge of our civilizations is not of concern, is not of central import to our cultures, "what will happen the next time the mob comes?" (03:12), as the camera pans up, away from Alexandria and into the black everlasting night of space.

Tyson, aboard the Ship of the Imagination, says, "We've come a long way together" (04:54) and runs down, in general contrasts, what we've explored in ASO. But now it is time "to perform an experiment" (05:57). The camera and ship begin to fly through complex

nebulae and star fields, “a thought experiment” (05:41). Tyson provides the details for the experiment, prompting us to think of the incomprehensible number of stars in an inconceivable number of galaxies, each star likely with dozens of planets. “Pick a star” (05:44), as he points and one highlights, and then to another, and it highlights too. “Suppose on one of them there lives an intelligent species…who believe they have it all figured out… their knowledge is complete. How seriously would you take their claim?” (06:32). The camera rushes out, zooming increasingly faster to fill the screen with the Milky Way. “Our ancestors believed the universe was made for them…The architecture of our language, myths, and dreams comes from that prescientific age” (06:57).

Tyson turns inwards on SotI, and a digital facsimile of Martin Behaim’s 1492 globe appears. Tyson uses this to continue building the thought experiment, revealing how it misses North and South America, and Antarctica, and asks, “It’s easy to feel smug, right?” (07:32). By contrast and context, Tyson claims that Behaim “knew infinitely more about his world, the Earth, than we know about ours, the universe” (07:44). Here we can see the narrative of the GCN at work, as Tyson is building a case for the “Great Demotion” which Sagan used in his 1994 book, *Pale Blue Dot: A Vision of the Human Future in Space*, which will be of thematic importance for this episode. Sagan’s Great Demotion is the successive displacements of humanity from the centre of the Cosmos: “downgrading experiences, demonstrations of our apparent insignificance” (1994: 21). This resonates with the process of secularization I discussed in Chapter Three, though the two operate at different registers. Where Sagan narrates a series of empirical discoveries that progressively diminish humanity’s cosmic centrality, Taylor’s account in *A Secular Age* (2007) describes a transformation in the conditions under which belief and unbelief become live options, rather than a straightforward demotion or loss. The two do not engage with each other directly, though a brief mention of Sagan is made on page 567 of Taylor’s work, but both illuminate

how modern self-understanding has been reshaped by the displacement of humanity from a privileged cosmological position; Sagan empirically, Taylor structurally.

Tyson is guiding the viewer through, as Schaefer called it, the affect of science, that engages the audience to think through issues they have likely faced in their own lives, or at least have an intuition about, as it is "natural to assume that we were at the centre. After all, it looks like the Sun and stars all revolve around us" (06:49). By having the audience participate in these questions, they may arrive at the feeling the GCN is no doubt at risk of introducing, small, meaningless existence, but Tyson does not give pause for such thoughts to bloom—"A recent lesson in humility will serve to illustrate" (07:48). The scene transitions to an animated sequence of a hot air balloon surrounded by people on a grassy field in Austria. The aeronaut of the balloon is Victor Hess, and the year is 1912. He made many voyages in his balloon to solve a "mystery that defied understanding" (08:03), a mystery that even today lacks a "complete explanation of what Hess found" (08:16). That mystery is cosmic rays.

Tyson's voiceover details Hess's work on cosmic radiation, including some of the experiments Hess conducted while in his balloon, while the animation acts out Hess's journeys. However Hess was not fully informed, "and so, for the wrong reason, he came to the right conclusion" (10:05). But what Hess didn't know and would "take decades to trace" was the "unimaginable violence" that created that radiation (10:32), Tyson says while in a hot air balloon himself with cosmic rays crashing in the starry night sky behind him like lightning. Tyson explains some of the context behind the search for the source of cosmic rays before he says, "Enter Fritz Zwicky, the most brilliant man you've never heard of" (11:19), and an elderly man with a bolo tie appears beside Tyson.

Tyson details Zwicky's role in cosmic rays, specifically that he and his colleagues discovered what we now call supernovae in 1933 and theorized the existence of neutron stars. However, Tyson interjects, this didn't account for the most energetic of cosmic rays, and

there is still no answer. Tyson interjects here that "we're fine with that. It's one of the things I love about science, we don't have to pretend we have all the answers" (12:40). This personal interjection reveals another vital aspect of the Grand Cosmic Narrative, the adaptability and malleability of its claims and knowledge. Beginning with Ludwig Fleck's *Genesis and Development of a Scientific Fact* (1935) and Karl Popper's *The Logic of Scientific Discovery* (1959), and continuing with Thomas Kuhn's *The Structure of Scientific Revolutions* (1962), the notion that science adapts, organizes, and corrects, has a rich history in the philosophy of science, and is likely one of the most important aspects of its epistemic culture. To identify these mechanisms, albeit not in the most technically sophisticated manner, is still to offer an honest, forthcoming, and essential form of science communication/popularization. It continues Sagan's call not to give in to authority.

Tyson continues to detail some of Zwicky's discoveries, including galactic gravitational lensing, and his most important discovery in 1933: dark matter. Tyson details how, in the 1970s, Vera Rubin could not explain how her observations of Andromeda showed that the innermost stars were revolving around the galactic core at the same speed as the outermost ones. After looking at 60 other galaxies and some "initial healthy skepticism, her colleagues looked for themselves" (15:13), confirming that "something massive and invisible" (15:24) was acting on matter across the universe. "And then, someone remembered crazy old Fritz Zwicky" (15:34), and the actor does a strange bow. Vera Rubin, Tyson says, had confirmed that the universe we thought we knew was much larger, about ten times more massive, than what we thought we knew and "filled with mystery" (15:58). This is mystery in the precise sense established in Chapter Three: an epistemic condition, not a residue of ignorance. Dark matter is not mysterious because science has failed, but because science has succeeded in disclosing the scale of what remains unknown. The affect it produces, affective through Tyson's tone of excitement rather than defeat, is accordingly not enchantment of the

unknown (the porous self's ambient experience of an animate Cosmos) but something closer to enchantment of the revealed operating in negative: what science reveals is the depth of what it has yet to explain, and this disclosure is itself a source of awe.

The "bigger unsolved mystery" (17:15) that Tyson had been hinting at throughout the entire episode encompasses the grandest scales of the Cosmos we know. The camera begins zooming out from the Milky Way, rushing out faster and faster to fill the screen with so many galaxies that they appear as stars, while ethereal music plays, and Tyson details the countless numbers of known cosmic objects; all of it "amounts to only five percent of what is actually there" (17:12). More mysterious than dark matter is "dark energy, which makes up even more of the Cosmos and drives its expansion" (17:22), and the viewer is now seeing filaments of galaxies of such magnitude that it appears as thick waves and filaments glowing a soft purple, filling the screen. Tyson says that "Zwicky's supernovas that lit the way to the revelation of its existence" (17:29), and details how supernovae called "standard candles" (19:29) are used as measuring points, as they are always the same brightness. This helped "two competing teams of astronomers" (20:22) in 1998 to independently reach the same conclusion: the universe's expansion is accelerating.

As *Cosmos* has reminded us time and again, "it's okay not to know all the answers. It's better to admit our ignorance than to believe answers that might be wrong" (21:12). The GCN is bound to this ethos. The credibility of science is not perfect accuracy; it uses logos to pursue a pathos of continual review. As Sagan did before and Tyson does now, the GCN, as demonstrated in Cosmos, has continually put science into question, urging viewers to think critically about the answers given and to ask new ones. However, it is through openness to discovery and the pursuit of knowledge that the narrative whole of the Grand Cosmic Narrative is realized, as other forms of science communication aim to do. *Cosmos* is an invitation to collaboration and the continued transformation of our knowledge of the world.

As Tyson says, “Pretending to know everything closes the door to finding out what’s really there” (21:17).

The following sequence begins with a call back to the first episode of ASO, as the scene opens with Voyager 1 floating through space in our view, which has been on the “longest odyssey of all of history” (21:45). Tyson details the many accomplishments achieved since Voyager 1 and 2 launched in 1977, including the first close look at Jupiter’s Great Red Spot, discovered volcanoes, water, and hydrocarbon seas on the moons of Jupiter, Saturn, Neptune, and more. It was also the first human craft to break free of our Solar System’s heliosphere, effectively entering interstellar space. When Voyager did enter these uncharted “exotic waters” (21:24), Tyson explains, its detectors reported it was “being pummeled by more and more cosmic rays” (24:20). Tyson explains how the heliosphere reacts to cosmic events, expanding and contracting to such events as supernovae, with particularly violent ones pushing the heliosphere perhaps all the way inwards of the sun.

“Luckily,” Tyson says, “this doesn’t happen very often” with the last occurring “perhaps two million years ago” (25:06). Tyson reflects on this and asks, “How can we possibly know this?” (25:16). The camera here is tight on Tyson’s face, intimate and personal. He explains how manganese nodules, small rocks on the ocean floor that grow “very slowly…a millimetre in a million years” (25:38), and real electron microscopic images of their chemical composition are shown on screen. These nodules “grow in partnership with bacteria by taking up minerals dissolved in the seawater” (25:48). Supernovae create a telltale radioactive iron, which the bacteria added to the nodules, and scientists found the telltale radioactive signature of that special type of iron. Using the known rate of growth, these scientists could reference astronomical data and make the connection. “The difference between seeing nothing but a pebble,” Tyson says, double-taking the nodule he holds in his

hand, “and reading the history of the Cosmos inscribed inside it is science” (26:25), and the background fades to only show Tyson staring meaningfully at the viewer.



Tyson looks meaningfully at the viewer while discussing manganese nodules (ASP Ep.13 - 26:25).

Returning to Voyager, Tyson, facing outward from the viewfinder on SotI with the camera looking in, details how we stay in communication with the spacecraft, even though it is so far away. But when the ability to send commands ceases, “the last and by far the longest phase of the Voyager mission will begin” (27:07). The camera, now inside SotI, aims at the viewfinder with Tyson sitting in the chair looking outwards at Voyager, the music building triumphantly. Tyson stands and explains that Jupiter acted as a slingshot, accelerating Voyager out of the Solar System. “Carl Sagan recognized that the Voyager mission offered two free tickets to something approaching eternity” (27:36), he says, detailing how a small team was assembled to create what would be known as the Golden Record. The camera

transitions to Voyager, the Cover that houses the Golden Record, visible in the distant Sun's reflection.

Quoting the Assyrian king Esarhaddon from twenty-six centuries ago, Tyson reflects on how the "hieroglyphics" on the Golden Record Cover "continue that ancient tradition" (28:07) of spreading a message far into the future. Tyson then goes through the message of the Cover, detailing its message, each element building on the other, which is designed to be "read by the beings of other worlds and times" (28:14) through the "universal language: science" (28:33). Asking us to imagine ourselves "extraterrestrial archaeologists for a few moments" (29:54), Tyson asks what we would make of an artifact "fished from the cosmic ocean" with music, greetings of 59 languages and one whale language, and a sound essay, and the brain-waves of a young woman newly fallen in love?[51] "All of that will live for a billion years" (30:54), Tyson says in a calming, reassuring voice, as the song "Dark Was the Night" by Blind Willie Johnson plays, and Voyager sails past Soti, leaving it behind to continue on its mission into deep interstellar space.

The scene transitions to Tyson standing on the Cosmic Calendar, where he asks, "How long is a billion years?" (31:09), and the camera rushes up and out to put the whole Calendar into view. On the Cosmic Calendar, it is about one month, and Tyson details what happened over the last one billion years. Earth's surface was uninhabitable and looked probably like Mars, and single-celled organisms "dominated the oceans" (32:15), some in colonies called 'microbial mats'. But, Tyson asks, "What would Earth be like?" (32:27) a billion years from now. It is so far in the future, we can't say much definitively, but what "we can say for sure is that Earth as we know it will be so changed that we would scarcely recognize it as home" (32:51). But "something of who we were and the music we made in

[51] The brain-waves are Ann Druyan's as she and Carl Sagan met and fell in love during this project. This project also happened to include Sagan's current wife at the time, Linda Salzman.

that long-ago spring will live on" (33:03) Tyson says as he looks up to the future projector on the ceiling of SotI which shows a distant future Milky Way. An oboe plays a contemplative melody.

Carl Sagan, Tyson tells us, was also part of the imaging team for the Voyager missions, and "it was his idea that Voyager take one last picture" (33:38). A generation before, Tyson explains, the Apollo astronauts aboard the last Apollo mission to the moon, Apollo 17, took the "Blue Marble" photograph, which I detailed in Chapter Three: "It became an icon of a new consciousness" (33:52). Standing up, Tyson continues, "Carl realized the next step in this process" convincing NASA "for one last look homeward in what he called the 'Pale Blue Dot'" (34:09). The music begins to gently swell with emotional strings as Tyson fades and the silhouette of Earth fades in. Carl Sagan's voice begins, a digital remaster of the saved recording from the audiobook of Sagan's book, *Pale Blue Dot* (1994), which was destroyed due to mishandling. As the sequence progresses, the camera follows the digitally recreated path Voyager took, culminating at the location where the "Pale Blue Dot" photograph was taken, some six billion kilometres from Earth. I include the passage here in full:

> That's here. That's home. That's us. On it, everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives. The aggregate of our joy and suffering, thousands of confident religions, ideologies, and economic doctrines, every hunter and forager, every hero and coward, every creator and destroyer of civilization, every king and peasant, every young couple in love, every mother and father, hopeful child, inventor and explorer, every teacher of morals, every corrupt politician, every "superstar," every "supreme leader," every saint and sinner in the history of our species lived there—on a mote of dust suspended in a sunbeam.

The Earth is a very small stage in a vast, cosmic arena. Think of the rivers of blood spilled by all those generals and emperors so that in glory and triumph they could become the momentary masters of a fraction of a dot. Think of the endless cruelties visited by the inhabitants of one corner of this pixel on the scarcely distinguishable inhabitants of some other corner. How frequent their misunderstandings, how eager they are to kill one another, how fervent their hatreds.

Our posturings, our imagined self-importance, the delusion that we have some privileged position in the Universe, are challenged by this point of pale light. Our planet is a lonely speck in the great enveloping cosmic dark. In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves.

The Earth is the only world known so far to harbour life. There is nowhere else, at least in the near future, to which our species could migrate. Visit, yes. Settle, not yet. Like it or not, for the moment, the Earth is where we make our stand.

It has been said that astronomy is a humbling and character-building experience. There is perhaps no better demonstration of the folly of human conceits than this distant image. To me, it underscores our responsibility to deal more kindly with one another and to preserve and cherish the Pale Blue Dot, the only home we've ever known (37:31).



The Pale Blue Dot image was recreated digitally for the conclusion of ASO. The small dot in the red-ish band (circled in red) is Earth. (ASO Ep.13 - 37:32).

This impactful scene at the conclusion of the 2014 *Cosmos* series probably best represents both the profound difference between *Cosmos* as science communication/popularization and as a new narrative genre, which I have called the Grand Cosmic Narrative. Sagan's "Pale Blue Dot" passage was the product of a career of communicating science with the narrative framing of a cosmic ethic, which, as I have noted in the content analysis of the original series, was present throughout it. In fact, on June 6, 1990, Carl Sagan spoke on behalf of NASA at a press conference regarding the Voyager missions, where he expressed sentiments similar to those he would later commit to prose in the book *Pale Blue Dot*.[52]

[52] See The Planetary Society's, which Sagan co-founded, website here for a video on this: https://www.planetary.org/video/carl-sagan-unveils-the-pale-blue-dot

Sagan's continued vision of a society where the knowledge of science and technology was in the hands of the people, rather than being concentrated solely in the hands of governments, corporations, and the wealthy, was a critical angle in his development of the Grand Cosmic Narrative.[53] It is essential to recognize that science was, as Sagan claimed, a "way of thinking", one that granted us the power to be inquisitive about the world around us. And in the GCN, the world is not just the stuff of science, but everything in the Cosmos, meaning all of humanity's complex psychosocial creations as well. To adopt this stance is to protect our ancestral legacy, for "if we are not able to ask skeptical questions, to interrogate those who tell us that something is true, to be skeptical of those in authority, then we're up for grabs for the next charlatan, political or religious, who comes ambling along" (Charlie Rose, 04:23). Skepticism, in Sagan's view, is the tool that will enable us to be 'unafraid of the dark'. It is here that the technosubjectivity I introduced in Chapter Three returns: Voyager is not merely the instrument that took the photograph, but a carrier of the subjective horizon of human consciousness—Sagan's, NASA's, ours—that the photograph then preserves and transmits to the world.

The digitally recreated "Pale Blue Dot" image hangs on the screen for six seconds of silence when Sagan concludes. Breaking the silence, Tyson begins the concluding sequence, and he asks how we came to be able to do so much and venture so far, even though we are, in a cosmic perspective, so small. "It was the work of generations of searchers who took five simple rules to heart" (38:18), Tyson responds, and he lists those rules he stated on the Shores of the Cosmic Ocean in Episode One: 1) question authority; 2) think for yourself and question yourself; 3) test ideas through observation and experiment; 4) follow the evidence

[53] Sagan's view here is most clearly expressed on *The Charlie Rose Show*, 27 May 1996, a few months before Sagan's death. You can watch a clip that directly speaks to this here: https://www.youtube.com/watch?v=d8O1e_TZHZo, with the full interview here: https://charlierose.com/videos/9094

wherever it leads; and 5) remember that you could be wrong. The music builds as strings grow in the aptly titled "Sacred Searching" plays, and flashbacks to the animated sequences throughout the show are shown on screen as Tyson details those rules.

When Tyson reaches the final rule, a flash of hundreds of men and women scientists appears on screen in rapid succession. He tells us they had all made mistakes but kept moving forward, ending with Antoine Henri Becquerel and Tyson asking, "Have scientists known sin?" (39:40). Stars explode on screen, reaching supernova. The screen goes white and transitions into thermonuclear weapon test footage, "Of course. We have misused science, just as we have every other tool at our disposal, and that's why we can't afford to leave it in the hands of a powerful few" (39:57). The camera slowly pans around SotI as it reflects the star-filled space around it and we see Tyson standing in front of the viewfinder looking out, "The more science belongs to all of us, the less likely it is to be misused" (40:03).

A candle burns against a black background, and the camera slowly zooms out, revealing more candles. The camera speeds up, transforming the candles into the night sky and showing Tyson standing on the rocks from Episode Two. "Learning the age of the Earth or the distance to the stars…what difference does that make?" Tyson asks, "Well, part of it depends on how big a universe you're willing to live in" (40:31). While some may like it small, Tyson likes it big; he says with a grin, "and when I take all of this into my heart and my mind, I am uplifted by it" (40:43). He presses on, "when I have that feeling, I want to know that it's real…that it's not something happening inside my own head, because it matters what's true, and our imagination is nothing compared with Nature's awesome reality" (40:59), looking deeply and emotionally at the camera.

A sequence of awesome cosmic imagery, both real and digital, is displayed on screen as Tyson explains the mysteries he wants to know about today, waiting to be solved. He appears on the Shores of the Cosmic Ocean again, "we, who embody the local eyes and ears

and thoughts and feelings of the Cosmos, we've begun to learn the story of our origins—star stuff contemplating the evolution of matter, tracing that long path by which it arrived at consciousness" (42:05). We carry a "cosmic legacy spanning billions of years. If we take that knowledge to heart, if we come to know and love nature as it really is, then we will surely be remembered…as good, strong link in the chain of life…and our children will continue this sacred searching" (42:27). Tyson turns to face the Cosmic Shores as the camera pans up as the music triumphantly swells before calming to a simple piano melody as the chair on SotI is revealed to be empty, heading to the stars, waiting for its next explorer.

The conclusion of ASO and Tyson's closing dialogue mobilizes all three registers of enchantment through rhetorically precise means. The appeal to what is 'real' when he says "I want to know that it's not something happening inside my own head" is logos in service of enchantment of the revealed: the awe Tyson describes is not projected onto the Cosmos but disclosed by it. The language of "sacred searching" and "cosmic legacy" is enchantment of the narrative: secular scientific history invested with the affective vocabulary of the transcendent. And the iconic empty chair, echoed from APV in its invitation to future explorers, sustains mystery as an open epistemic horizon, ensuring that the GCN's enchantment is not a closed system but a generative one. That "sacred" is the word chosen for this search is itself significant; it is not used ironically or metaphorically but as the GCN's most direct claim that the pursuit of scientific knowledge is itself the end which reoccupies the answer position once held by religious devotion.

Conclusion

As this chapter has strived to make clear, the *Cosmos* series transcends conventional science communication and popularization models, which helps in establishing itself as a novel

narrative genre that bridges scientific understanding with a world-ethic, a deep sense of connection, and spiritual meaning. It is a complex tapestry woven from various models of science communication, seamlessly integrating elements of the deficit, contextual, lay expertise, participation, and dialogue models. This hybrid approach, coupled with its profound and meaning-making narrative, is deeply intertwined with the popularization and communication of science, which serves as the foundation for this narrative world-building. In view of this, *Cosmos*, as I have argued, is more culturally and historically significant than scholars working primarily in the history of science communication initially perceived. The significance is not because the GCN has displaced older framings of the science-religion relationship, but because it represents a distinctive and culturally resonant attempt to offer an alternative, one whose reach and persistence warrant serious analytical attention. While other science programmes and texts inspire awe, what I called enchantment of the revealed—the affective response to science's disclosure of overwhelming scale—*Cosmos* mobilizes the full convergence of the three: enchantment of the unknown sustained as an inexhaustible scientific frontier, enchantment of the revealed in its disclosure of cosmic deep time and stellar nucleosynthesis, and enchantment of the narrative in its investment of secular history with the affective weight of sacred story. It builds a sustained connection to the universe by mobilizing enchantment of the narrative, investing the secular history of science with the affective weight of sacred story, and by preserving mystery as an open epistemic horizon that invites continued inquiry. It builds a connection to the universe, a relationality to it and everything that resonates with a contemporary audience increasingly seeking the secular-transcendent, a type of spirituality that the SBNR, and perhaps others, may seek.

As I have identified in the content analysis section of this chapter, the rhetorical strategies employed in *Cosmos* are central to its success. By masterfully utilizing ethos, pathos, and logos, the series establishes the credibility of its scientific claims, evokes

powerful emotional responses, and presents logical arguments in an accessible manner. Carl Sagan and Neil deGrasse Tyson, as charismatic communicators, embody the scientific-prophetic ethos, building trust and fostering a deeper appreciation for the GCN narrative. This deliberate engagement with covenant values—those shared beliefs and aspirations of a community—allows *Cosmos* to connect with audiences on a profound level, unlike other forms of science popularization and/or communication, by, for example, transforming complex scientific concepts into relatable *and* emotionally resonant stories with a sustained narrative of cosmic meaning-making that addresses questions typically reserved for religious or philosophical discourse.

Furthermore, *Cosmos*, as a text of popular culture, has reached an unparalleled global audience, elevating the names of Carl Sagan and Neil deGrasse Tyson from occasional acknowledgments to household names. *Cosmos's* pervasive presence in the cultural culture demonstrates its ability to translate specialized scientific knowledge into a widely intelligible and appealing form, one that, through its narrative, can capture the attention of generations of viewers and embody its message. Yet we must confront an uncomfortable reality: this cultural pervasiveness coexists with—and has not displaced—the persistence of the conflict thesis at the macro-sociological level. If the GCN has indeed reached hundreds of millions to billions, why does the conflict framing remain so durable? The answer, which I shall develop in the concluding chapter, lies in distinguishing between cultural recognition and worldview formation. The GCN's reach is real, but it operates primarily as a meaning-making resource for audiences already predisposed to secular or integrative frameworks—particularly the growing 'spiritual but not religious' demographic—rather than as a force capable of overturning the conflict thesis across the broader culture.

Moreover, the accelerating political polarization of the early twenty-first century has supercharged the very conflict framing the GCN was designed to transcend, creating

headwinds that no television programme, however culturally embedded, could be expected to overcome. Unlike some popular science texts that prioritize entertainment over accuracy, or vice versa, *Cosmos* maintains scientific integrity while leveraging narrative and visual spectacle to engage and persuade its audience. Moreover, it presents a worldview in which science is not just a practice but also a way of thinking. The integration of science and popular culture, once a less-explored academic intersection, is now recognized as a potent force in shaping public understanding and engagement with scientific issues, and *Cosmos* is a rich example of this intersection.

Another critical intersection for *Cosmos*, as I have argued throughout this dissertation, is the series's unique connection to the field of science and religion studies. Being a complex text that engages each of Ian Barbour's four-fold typologies of science and religion, it is a testament to both *Cosmos's* innovative narrative structure and the importance of the Complexity Principle. By incorporating elements that echo mythic traditions and addressing fundamental questions about human origins and destiny, while simultaneously establishing ethical principles for engaging with the world and a stance towards it, *Cosmos* offers a form of secular spirituality. It encourages a renewed sense of wonder and connection with the universe, providing a meaningful framework for those who identify as "spiritual but not religious." This approach demonstrates that scientific understanding can coexist with, and even enhance, both a sense of transcendent meaning in the natural world and a materialist view.

As the final chapter of analytical content in this dissertation, my aim with these two final episodes of *Cosmos: A Personal Voyage* and *Cosmos: A Spacetime Odyssey* was to show how they stand as paradigmatic examples of the Grand Cosmic Narrative in action. Through a meticulous blend of historical narratives, philosophical discussions, and contemporary perspectives, these series not only popularize science but also serve as

powerful rhetorical bridges between scientific understanding and spiritual meaning. They offer a compelling vision of humanity's place in the universe, inviting audiences to embark on a shared journey of discovery and re-enchantment, not as a return to the porous self's ambient experience of the unknown, but as the production of new forms of enchantment from within secular conditions. This framing, I argue, is designed to produce a sense of deepened connection with the Cosmos and with other human beings—an effect that the series' sustained popularity and cultural reception suggest it achieves for at least a portion of its audience. This was perhaps best expressed by the inclusion of the full-length audio of Carl Sagan reading the "Pale Blue Dot."

Chapter Six

A Grand Cosmic Narrative for a Secular Age

Science is more than a body of knowledge; it is a way of thinking. I have a foreboding of an America in my children's or grandchildren's time—when the United States is a service and information economy; when nearly all the key manufacturing industries have slipped away to other countries; when awesome technological powers are in the hands of a very few, and no one representing the public interest can even grasp the issues; when the people have lost the ability to set their own agendas or knowledgably question those in authority; when, clutching our crystals and nervously consulting our horoscopes, our critical faculties in decline, unable to distinguish between what feels good and what's true, we slide, almost without noticing, into superstition and darkness.

– Carl Sagan, *The Demon-Haunted World*

Introduction

We are approaching the end of this story, and, having spent time with the GCN and *Cosmos* across these many pages, the lessons learned along the way make the quote above feel like a premonition. The North Atlantic world, led by the United States' past successes, has indeed shifted to service and information economies. Their manufacturing has slipped away, and a

very powerful few control technology companies representing nearly one-third of the US market (Levy 2025). There seems to be such divisive polarization that there doesn't seem to be a handle on any issue, and there appears to be no olive branch in sight. The world as it is right now, at this moment, at least at the macro-scale, seems to be sliding towards superstition and darkness. Sagan's warning seems vindicated, and this is itself a finding of this dissertation that I must emphasize plainly. The GCN, for all its cultural reach and narrative power, has not prevented the slide into scientific illiteracy and superstition that Sagan feared. A meaning-making framework can be culturally important, even transformative for the audiences it reaches, without being powerful enough to reverse structural trends driven by political polarization, institutional erosion, and the fragmentation of epistemic authority. Any authority, epistemic and cultural, that science may have had in the wake of World War Two, reflected in the comic books, television, movies, novels—the collective popular culture—seems to have slipped away and been challenged by competing interests, competing ways of knowing, competing values, and often from small numbers of highly influential people (Oreskes and Conway 2010). How do we each reconcile our place in the world when the world we want to see and the world as it is are so different? Is there a means by which we can come to an understanding so as to be at home not only in our local communities but within the world at large?

These are not simple questions, and there is no one single answer for them, but the Grand Cosmic Narrative presents itself as one such avenue towards reconciliation—one among several, and one whose sphere of influence is necessarily circumscribed by the cultural and political conditions in which it operates. The qualifier 'one such' is doing important work here and deserves attention: the GCN is not the only attempt to move beyond the conflict thesis, nor is it the most influential across all demographics. This is obvious from my discussion on the Epic of Evolution and the Humanist Blockbuster in Chapter Two. The

GCN's power lies in its particular mode of address—transcendent narrative, affectively charged, sensorily meaningful—and in its resonance with audiences already seeking integrative frameworks for understanding themselves, their environment, and their place in the world through science and meaning. The cultural conditions documented in the preceding chapters were designed to help explain why the GCN speaks to these and gained traction as such, especially among audiences predisposed to integrative and secular-spiritual orientations.

But this story doesn't end on a melancholy note. The claim I made when we started this story was that the 1980 television programme *Cosmos: A Personal Voyage*, as well as its follow-up spiritual reboot, *Cosmos: A Spacetime Odyssey* (2014), and to a lesser extent in this dissertation, the 2020 sequel *Cosmos: Possible Worlds*, directly engage the field of science and religion by being about science and which borrows, or as I argued "reoccupies" religion, broadly understood. I have detailed how this is the case by showing that while the content and details of the story of *Cosmos* communicate and popularize science, the narrative—the constructed meaning it presents—borrows from the spiritual and Abrahamic traditions, especially Christianity. In so doing, by delivering the knowledge of science as giving rise to meaning, in science being a worthwhile endeavour for us to support, *Cosmos* presents what I have here called the Grand Cosmic Narrative, a distinguished narrative genre that can trace its lineage back through the grand narratives of science and religion of times past. The GCN therefore reoccupies the space of spiritual and faith traditions for those who seek meaning, guidance, and hope, but in a non-theistic, non-traditional way. Using the *Cosmos* television programme, an incredibly popular media text from the lexicon of popular culture, my intention here was to show how contemporary popular culture fits within current discussions of science and religion.

We started this story with a general discussion, setting the table for this work. There, I laid out the basic ideas that would run through the course of this dissertation, beginning with the field of science and religion. I gave a view of the field as I see it, careful to draw attention to the historical and analytical aspects most relevant to us: the conflict thesis and the typologies of the science-and-religion engagement, and the importance of the Complexity Principle in any work encroaching on the enterprises of science and religion from a historical and cultural framing. It is here, in the area of science and religion, which I call science and religion studies (SRS), that I have situated myself. One of my sub-objectives in this dissertation was to provide a sustained, deeper analysis of the engagement of science and religion in popular public discourse through a popular programme. This effort was undertaken to help legitimize popular culture and the social texts of media from the 20th and 21st centuries in the field of SRS. I detailed Carl Sagan, Ann Druyan, and Neil deGrasse Tyson—the main "characters" in the story I have told here—sharing their backgrounds and the motivations that drove the creation of *Cosmos* in the 1970s, amid a global Cold War and rising political and public tensions. These motivating cultural conditions, the milieu of its genesis, play an essential role in framing the science, serving as the catalyst for the GCN's creation. But in so doing, the GCN transcended the relevancy of time periods by becoming sufficiently open to narrative alteration, a theme we explored in Chapter Four. I offered what was similar and what was different about *Cosmos* to other grand-narrative forms of science popularization that have been written about, such as the Epic of Evolution and the Humanist Blockbuster, before hinting at some of the programme's visual and narrative elements that went beyond those texts.

In Chapter Two, we began the work to understand the forces at play in Sagan and Druyan's construction of the GCN. To do this, we had to understand the purpose that motivated the project in the first place. The sociological work on science and religion by

Elaine Howard Ecklund and her colleagues revealed a growing group in the population, a gap in the population's perceived meaning-making practices: the "spiritual-but-not-religious" (SBNR). It was this group that I drew attention to and took inspiration from, as it formed the first component for my argument: The GCN is particularly adapted to people within this group. This observation is, I suggest, one of the most important keys to resolving the apparent tension between the GCN's cultural reach and the persistence of the conflict thesis. If the GCN's primary sphere of influence is the SBNR demographic, then its 'failure' to displace the conflict thesis is not a failure at all but a misidentification of its audience. The conflict thesis persists most powerfully among populations shaped by evangelical-secular polarization—populations the GCN was never designed to reach and for whom its mode of address is largely illegible. The GCN succeeds precisely where it was always most likely to succeed: among those already seeking alternatives to both institutional religion and reductive scientism. This is a meaningful and analytically significant sphere of influence, but it is not the universal cultural displacement that some of my earlier formulations may have implied.

While not explicitly stated by Sagan and Druyan, I argue that this group was their suggested focus, as revealed in their introductory remarks and the script of *Cosmos*. I then began to unpack grand narratives, focusing primarily on the work of the cultural philosopher Jean-François Lyotard, to set the stage for how scholarly perceptions of grand narratives in our time have been framed. I then linked into grand narratives of science that had come before and been written about by scholars who, interestingly, were mainly historians of science. The two we were contending with were the Epic of Evolution and the Humanist Blockbuster, the former identified as early as the 19th century, and the latter a recent term for 20th-century British television science documentaries. We then engaged with the first content analysis section of *Cosmos*, both the 1980 original with Carl Sagan, *A Personal Voyage*, and the 2014 spiritual successor and reboot with Neil deGrasse Tyson, *A Spacetime Odyssey*. I

concluded this chapter by asserting that *Cosmos* warrants a unique genre identifier: the Grand Cosmic Narrative.

In Chapter Three, we began a philosophical and historical discussion on the role of the secular, secularism, and secularization, and what they contribute to this project's aims of detailing a grand narrative of science for an SBNR subset of the population. Here, we primarily engaged with the work of Charles Taylor, among others, to understand how space could have been formed in the cultural field for a religious-like, yet science-based, grand narrative, one with the meaning-making, moral landscape, and world-building qualities of the myths of the world's religions and spiritual traditions. We also contended with an adjacent work and popular contention with modernity, the disenchantment of the world, initially proposed by Max Weber. We pushed against disenchantment, corroborating with others that the world is not disenchanted, at least not so through fragmentation and micro-communities. However, we left open the possibility that, zoomed out, the appearance of disenchantment has held, and we continued here from the work in Chapter Two by claiming that grand narratives may play a role in this appearance of disenchantment. This led directly into the subsequent content analysis of Cosmos, episodes that each demonstrated how the GCN operates not only as a narrative genre but as what that genre produces in its viewers: a way of thinking, an orientation towards the world, one that challenges us all to "see for ourselves".

Chapter Four continued the philosophical work, but this time focused on the concept of narrative and its many entanglements. We unpacked the significance of narrative by exploring how scholars have theorized its implications—both structural and psychological—and concluded that narrative plays a central role in the positioning and orientation of people and social structures, individually and collectively. I then introduced the philosophical and linguistic work of Hans Blumenberg, focusing on his framework of "reoccupation" to detail, in connection with Charles Taylor's work on option "3" of the secular in the North Atlantic

World, how science could have become an option in the conditions of belief in lieu of God. Science, framed within the GCN, "reoccupies" Christian theological "answer-positions" by sourcing long-standing metaphysical questions from the methods of scientific inquiry. I then offered the work of Donovan Schaefer on affect to suggest that part of the appeal of the GCN is that, by reoccupying the theology and narrative strategies of global faith and spiritual traditions, it reframes science as meaningful, giving emotional resonance to the possibilities that embracing the GCN may offer. To demonstrate this, I guided us through the first episode of both *Cosmos* series, which offered a grand, sweeping account of space and time, revealing the embedded moral and meaning-making attributes of those episodes.

The last chapter, Chapter Five, addressed the form of media that *Cosmos,* at its most basic, encompasses—science popularization. It was essential for us to understand what science popularization and science communication were, for us to proceed any further in this exercise, and it was my claim that while they do have differences, for the purposes of this dissertation, those differences were not sufficient to make a definitive claim regarding the GCN's capacity to displace the conflict thesis at the level of public discourse. However, the importance of this exercise was that *Cosmos* was revealed to be utilizing a hybrid strategy of different models of science communication, and, in combination with the work done up to that point, reveals the reflective, conscious, purposeful effort of the writers—Carl Sagan, Ann Druyan, and Steven Soter—to craft a unique work of science popularization. This, I claimed, further evidenced my overall argument that *Cosmos* was forging a new narrative path—a Grand Cosmic Narrative—something that Sagan had worked towards throughout his life and that Ann Druyan and their daughter Sasha Sagan (2019) continued to do. I concluded this chapter and the last content analysis of this dissertation with the concluding episode from both *Cosmos* series, to reaffirm not only the differences in the presentation of science but also in the claims and framing, thereby cementing the GCN's status as a unique grand narrative of

science. The GCN acquires epic and mythic status as a narrative that fulfills timeless needs, infinitely adaptable and endlessly alterable, within its narrative core.

Now, here in the concluding Chapter of this dissertation, we will undergo one final push to bring together all of the threads of this project to synthesize the preceding analyses into a demonstration that the GCN has emerged as a functioning option within the contemporary landscape of meaning-making, one whose operations, genealogy, and cultural appeal this dissertation has sought to document, one that is expressly oriented towards the group that Elaine Howard Ecklund and colleagues identified in their work in the United States, and one that, as I have suggested throughout this work, articulates principles of human flourishing that, while aspiring to universality, are necessarily shaped by the Western, liberal, and broadly secular-humanist traditions from which the GCN emerges. Whether these principles are truly universal or culturally specific lies beyond the scope of this dissertation.

While this concluding chapter will not add much new content, I will introduce a few scholars whose work has engaged directly with grand narratives of science in modernity and present my arguments for why I believe their work aids my work or misses the mark regarding *Cosmos* and the Grand Cosmic Narrative more generally. By the end of this concluding chapter, I aim to have demonstrated how the GCN functions within the contemporary landscape of belief and meaning-making, particularly for those whom Ecklund identified as "spiritual entrepreneurs"—individuals seeking frameworks of understanding outside traditional religious institutions.

Consecrating Science

Lisa H Sideris, Professor of Environmental Studies at the University of California, Santa Barbara, has made a career of examining the ethical implications of grand narratives of

science. She has specifically examined how "environmental" values are captured or obscured by narratives and perspectives from sciences and religions. She incorporates work on wonder in contemporary scientific discourse to focus on the mythic, religious, and ethical dimensions of those narratives. Her faculty page states that her overarching drive is to "articulate a vision of the human that is appropriate to the environmental challenges we collectively face" (University of California, Santa Barbara, n.d.). In her 2017 book, *Consecrating Science: Wonder, Knowledge, and the Natural World*, Sideris explicitly contends with science as a world-building, orientating narrative that is grounded in a critique of scientism, specifically "the *consecration* of science" (2017: 7). As she explains, "it invests science with sacredness, consecrated science often emerges as a rival and competitor not only with other religions, but with nature itself…Consecrated science is science too enchanted with itself to make…judgments wisely" (ibid.). But here lies my first challenge to Sideris's central argument: The content analysis conducted in the preceding chapters suggests that the GCN, as instantiated in *Cosmos*, does not position science as the sole arbiter of judgment. Rather, it frames scientific inquiry as one powerful contributing factor in the human story whose outputs merit serious consideration. This distinguishes the GCN's rhetorical operation from the "consecration" Sideris critiques.

Sideris offers a sustained normative critique of what she terms "the new cosmology"—a constellation of movements including the Epic of Evolution, the Universe Story, and Big History that attempt to craft sacred narratives from scientific knowledge which she has become "troubled by" (2017: 1). Sideris's concern for environmental ethics and misguided faith, similar to Mary Midgley, in science merit serious engagement, but her analytical framework exhibits significant limitations when examined through the lens of the Grand Cosmic Narrative, a closer analysis than she affords. Her central argument is that movements promoting science-based cosmic narratives represent problematic "consecrations

of science" that elevate scientific knowledge to sacred status, thereby undermining both genuine environmental ethics and appropriate forms of wonder. She claims that anthropocentrism is at the heart of these narratives, and argues that their celebration of humanity as "the universe become conscious of itself" naturalizes human dominance and prepares ideological ground for Anthropocene triumphalism (Sideris 2017: 88). Furthermore, she critiques what she perceives as knowledge-based, scientifically-mediated wonder—wonder *at* scientific discoveries and cosmic scales—as a degraded form compared to immediate, sensory, embodied wonder *at* the natural world itself. Drawing substantially on Rachel Carson's environmental philosophy, Sideris advocates for wonder rooted in direct encounter with proximate nature rather than abstract contemplation of deep time and cosmic evolution.

However, this critique fundamentally misapprehends the communicative and sociological functions that something like the Grand Cosmic Narrative serves within contemporary pluralistic societies experiencing rapid scientific advancement and religious diversification. Sideris raises legitimate concerns about the epistemological status of science but does not fully account for the communicative and sociological functions that the GCN serves. Sideris is right to be cautious about the boundary between science communication and normative claims, but the analysis offered here suggests that the GCN operates in a space that Sideris's framework—oriented primarily towards epistemological questions—is not designed to address. She treats these narratives primarily as failed environmental ethics or problematic theology, but this interpretive frame prevents her from recognizing their role as bridging mechanisms between scientific and religious worldviews in contexts where traditional religious cosmologies have indeed lost plausibility for portions of the population. Her dismissal of these narratives' mythopoeic aspirations as "scientism" overlooks the genuine existential and meaning-making needs they address—needs that persist regardless of whether

scholars judge their environmental ethics adequate. Moreover, and I think more importantly, Sideris seems to claim that there is a more real way to wonder, as if other wonders are less adequate or synthetic. This is troubling, as it suggests that there are right and wrong ways of how one ought to be affected by the natural world.

Moreover, Sideris's treatment of "wonder" as a stable, transhistorical category with clearly distinguishable "appropriate" and "inappropriate" forms fails to adequately attend to wonder's conceptual history and cultural specificity. Her Carsonian preference for sensory, immediate, mystery-acknowledging wonder, positions this one form as authentic and offering real, sustained value while dismissing scientifically mediated wonder as corrupt. Yet this binary oversimplifies the phenomenology of wonder and ignores how different forms of wonder may serve distinct but complementary functions. The taxonomy of enchantment I established in Chapter Three provides a more precise vocabulary for what Sideris collapses into a single opposition. Her "immediate, sensory wonder" corresponds to what I have called enchantment of the unknown—the porous self's ambient experience of a Cosmos alive with mystery, the mode that Carson's work exemplifies. But what Sideris dismisses as "scientifically mediated wonder" is not a single, degraded category. It encompasses at least two distinct registers: enchantment of the revealed—the awe generated when science discloses scales, connections, and structures that overwhelm ordinary comprehension (wonder at cosmic deep time, at stellar nucleosynthesis, at the mathematical elegance of physical laws)—and enchantment of the narrative—the affective charge produced when these disclosures are invested with the weight of sacred story, as when *Cosmos* frames the evolution of matter as a creation myth or the scientist as a prophetic figure. These are not degraded substitutes for Carson's wildflower encounters but genuinely distinct phenomenological modes, each appropriate to its object, each producing its own form of enchantment, and each contributing differently to the construction of meaning. By treating all

scientifically mediated wonder as a single category, Sideris foreclosed the very analysis her critique demands. This is entirely opposed to the vision of the GCN and borders on a normative claim that itself is rivalling scientism, the very thing that Sideris is writing against. If Sideris's critique of *Cosmos* itself makes normative claims about what science can and cannot legitimately do, then she is operating in the same contested space that she identifies as problematic.

Perhaps most problematically, Sideris's critique of interdisciplinarity as potentially reproducing scientific imperialism while she simultaneously advocates for taking science "seriously" (but not "too seriously") leaves her methodological position unclear (2017: 1). She wants humanities scholars to resist subordination to scientific authority while also correctly understanding and appropriately deploying scientific knowledge in environmental ethics. But she provides insufficient guidance on how to strike this balance or on what criteria distinguish legitimate from illegitimate uses of scientific knowledge in humanistic scholarship. Her own disciplinary position as a religious studies scholar critiquing both theologians and scientists suggests an Archimedean standpoint—a view from nowhere that can adjudicate competing disciplinary claims—that may not exist. The GCN, however, as documented in the content analysis, positions itself as offering a balance between scientistic overreach and anti-science relativism—a self-understanding that Sideris's framework is not equipped to assess because her analytical categories do not distinguish among the diverse forms that science-based narratives can take.

A critical question is whether the Grand Cosmic Narrative is a communicative and rhetorical phenomenon that risks inadvertently legitimating the problematic dimensions that Sideris raises. I spent much of this dissertation addressing historical, sociological, and philosophical frameworks that treat the narratives which Sideris finds so troubling as cultural artifacts, examining their structure, dissemination, reception, and cultural work. Sideris

argues that these narratives perform ideological work that warrants explicit opposition. If Sideris is correct that these narratives actively harm both environmental ethics and intellectual pluralism, I would examine the role that such scientific, technological, and epistemic works have played in the environmental movement as a whole. Recall that the "Blue Marble" image, taken by Apollo astronauts, became the symbol of the first Earth Day, a reaction that aligned with Rachel Carson's work and the Apollo missions.

While Sideris warns against scientism, noting that reality is "not the purview of science alone" (2017: 8), and is critical of efforts by figures like Richard Dawkins and E.O. Wilson to sacralize science through grand cosmic myths, I have taken great care to show how the GCN is *not* scientism. The GCN I have presented in this project, which likewise draws on scientific cosmology for meaning, shares Sideris's caution here. What Sideris's framework cannot accommodate is what the content analysis of this dissertation reveals: the GCN as instantiated in *Cosmos* does not treat scientific knowledge as a monolithic replacement for other ways of knowing. The enchantment of the unknown, as I developed it in Chapter Three, is constitutive of the GCN's narrative structure: Sagan's repeated insistence that "we have only just begun" our exploration, that "the open road still softly calls," that mystery regenerates itself at the frontier of every answered question, structurally prevents the closure that scientism demands. Science, in the GCN's framing, is not the destination but the vehicle of an inexhaustible journey—and the inexhaustibility of the frontier is the point. The series consistently foregrounds cultural diversity and frames scientific inquiry as an invitation to curiosity and skepticism rather than a demand for epistemic submission. Science alone is not enough; authority is not to be concentrated in the hands of the few. Like Sideris, GCN advocates are wary of turning science into a dogma or "consecrated" narrative without critical reflection. Any cosmic story must avoid conflating empirical facts with ultimate truth in a way that marginalizes other ways of knowing. In this respect, Sideris's concerns about

scientistic overreach are consonant with the GCN's own rhetorical posture of humility and self-critique—a convergence that Sideris does not acknowledge, likely because her analytical framework does not distinguish the GCN from the broader "New Cosmology" she critiques.

Sideris's work also amplifies concerns about anthropocentric hubris—another pitfall the GCN seeks to avoid. As stated above, she observes that the New Cosmology often "celebrates the modern human species and its unprecedented scientific knowledge as representative of the universe becoming conscious of itself" (Sideris 2017: 88). In other words, even as it tells a story of cosmic evolution, it can end up placing humans on a pedestal as the telos of the universe. Sideris's analysis of Thomas Berry and Brian Swimme's *Universe Story*, among others, reveals subtle forms of human exaltation: some narratives cast humanity as the culmination of evolution, the point at which the Cosmos attains self-awareness. But as I have argued, the GCN acknowledges this hazard. It shares Sideris's view that any grand narrative must resist the "grand anthropocentric tale"—the deep-seated desire to see humans as the ultimate purpose of creation or masters of nature (2017: 88). In alignment with Sideris, the GCN framework aspires to an anti-anthropocentric perspective, emphasizing humans as participants in a larger cosmic community rather than its proprietors, to see each expression of matter as unique and having a self-worth of recognizable value. Sideris's critique of anthropocentric triumphalism identifies precisely the tendency that *Cosmos*, as the content analysis has shown, explicitly works against, something that I directly showed challenged comparison with the Humanist Blockbuster. Whether the series fully succeeds in this anti-triumphalist aspiration across all its episodes is a more nuanced question than a blanket endorsement or condemnation allows. However, I attempted to make it clear that awe of the Cosmos in the GCN does not translate into self-congratulation or human conquest. Fundamentally, both Sideris and the GCN call for humility in the face of a vast universe.

Despite these resonances, Sideris poses a serious challenge by questioning the very legitimacy and desirability of a single "Grand Story." In *Consecrating Science*, Sideris argues that there is "no truly compelling reason why the [New Cosmology] story ought to be adopted as our new myth" (2017: 168). She is not convinced that humanity needs or benefits from one overarching cosmological narrative, even if it is scientifically informed. Sideris also worries that universal narratives can slide into universal myths of progress or truth that override pluralism. By conflating scientific cosmology with a source of ultimate meaning, the New Cosmologists, in her view, risk enforcing a homogeneous worldview and diminishing the rich diversity of cultural stories and values. This skepticism, however, is misguided and misidentifies the role the GCN plays in the social fabric I have presented. The GCN directly grapples with this critique. In each content analysis section, I carefully identify moments in the episodes that challenge Sideris's critique. Science in the GCN is part of the tools for knowing the natural world, not a replacement for ways of expressing the subjective experience of the world, in all its forms. *Cosmos* warns against homogeneity and the loss of diversity, and I have emphasized that this isn't just scientific but also broadly cultural, as expressed in the inclusion of many of the world's stories and cultures throughout the series.

Moreover, Sideris points out that the new cosmological mythmakers often assume people need a scientifically "true" story for spiritual or moral guidance, an assumption she finds dubious. She reveals a postmodern bias in her critique, a position I have argued has political and cultural ramifications in the North Atlantic world. Sideris is unconvinced, for example, that Ursula Goodenough's religious naturalist claim that knowledge of the world based on the practices of science can unite humanity "because it happens to be true" (Goodenough 1998: xv). That factual truth alone can not, in Sideris's view, be conferred with broad spiritual appeal or ethical vigour, and underestimates, in my view, the historical depth of the worldbuilding tradition that is reoccupied by the GCN and operates with the

phenomenological range of wonder that the enchantment taxonomy I have developed is designed to capture. The GCN embraces scientific accuracy as a foundation for a shared narrative, but that narrative is as vast as the Cosmos itself. Each expression of Cosmic Creation, from the single-celled organism to the barking dog, to the passing comet, to the tribe deep in the Amazon, is a part of that story; it has no bounds. The GCN is rooted in the original Greek meaning of Cosmos: to make the world orderly from chaos. It is an attempt at bringing together all the world's stories, all the world's cultures, all the world's way of being, together, on equal grounds, as unique and wonderful expressions of a lineage of "some of the things that atoms do given 14 billion years of cosmic evolution". What Sideris sees as the hubris of a one-size-fits-all cosmology is not the case, as the myriad of human, animal, plant—*all forms of matter* and *all expressions of the Cosmos*—are, in the GCN's framing, of equal value. This is, of course, a normative rather than a scientific claim, and it is worth acknowledging it as such: the assertion of equal value is a philosophical commitment that the GCN presents as though it follows from the scientific story, when in fact it requires an additional ethical step. This is indeed in part why the Humanist Blockbuster fails to encapsulate the GCN.

Sideris's position that we must be mindful and that we must consider telling many stories, in many voices, from many different places, is *precisely consistent* with the GCN's own rhetorical posture, which, as documented in the content analysis, consistently frames scientific inquiry through what the series calls "a simple set of rules": question authority; think for yourself and question yourself; test ideas through observation and experiment; follow the evidence wherever it leads; and remember that you could be wrong. Whether this posture of epistemological humility can be consistently maintained across all aspects of one's life and the institutions of governance and administration is itself a question worth interrogating.

I have engaged with Sideris's *Consecrating Science* here, as it is the most complete critique of the type of work we are looking at, and it compels us to ensure that the Grand Cosmic Narrative is as refined as possible. But, as I have discussed and shown throughout this work, her concerns, while analytically serious, are calibrated to a different object than the one this dissertation examines. Sideris's "New Cosmology" encompasses Big History, the Universe Story, and the Epic of Evolution, formations that, as I have argued, are structurally distinct from the GCN. Warning against scientistic arrogance, simplistic myth-making, and human hubris, her insistence on wonder with humility and her skepticism of monolithic narratives serve only to reveal the GCN's potential. In responding to Sideris, my aim here in the final chapter is to affirm that the Grand Cosmic Narrative, which is indeed grounded in science, does not fall prey to the pitfalls she enumerates. The content analysis conducted across the preceding chapters demonstrates that the GCN, as instantiated in *Cosmos*, does not exhibit the characteristics Sideris attributes to "consecrated science." It preserves mystery as an epistemic condition—what I have called enchantment of the unknown—while simultaneously producing enchantment of the revealed and enchantment of the narrative. The series' rhetorical posture, as documented in the episode analyses of each chapter, consistently positions science as provisional and self-correcting rather than dogmatic, and frames human significance as participation in, rather than dominion over, cosmic processes. Sideris's work, with its rich engagement with thinkers from Dawkins and Wilson to Berry, Swimme, and Goodenough, ultimately calls the GCN to a higher standard of self-awareness. Rather than dismissing her reservations, the GCN addresses them, demonstrating its ability to respond to such critiques and affirming its status as a grand narrative. In doing so, the GCN's narrative design, as this analysis has shown, aspires to what might be called awe without idolatry, knowledge without negating mystery, and unity without uniformity. Whether it consistently

achieves these aspirations or its cultural operations sometimes contradict them is a question that merits continued critical attention.

A New Story

One final work we must contend with that brings grand narratives of science into the spotlight is Nasser Zakariya's *A Final Story: Science, Myth, and Beginnings* (2017). Zakariya, an Associate Professor at UC Berkeley's Department of Rhetoric, offers a comprehensive intellectual history of scientific epics like those we have been looking at, offering sweeping narratives that claim to tell the history of the entire universe, spanning cosmological, biological, and social domains. Zakariya's central argument is that these totalizing narratives constitute distinct "genres of synthesis", which he has identified as historic, fabular, scalar, and foundational modes. These genres of synthesis are used by natural philosophers and scientists to frame all branches of scientific knowledge into unified wholes. Zakariya traces this tradition from late eighteenth-century figures such as Kant, Laplace, and William Herschel, through nineteenth-century synthesizers such as Alexander von Humboldt and his *Kosmos*, to twentieth-century science communicators, including Carl Sagan and Neil deGrasse Tyson. What distinguishes Zakariya's approach is his treatment of the historical narrative of science as itself a form of knowledge, one that discloses much about the development of our understanding of, and relationship to, science over time.

A core paradox that animates Zakariya's analysis is that, while inductive science has, broadly speaking, worked to separate and reject traditions and mythic authority, the very process of constructing totalizing scientific narratives entangles it more deeply in mythology. Drawing on Adorno and Horkheimer's *Dialectic of Enlightenment* (1947) that Enlightenment values and myth are "tightly and problematically intertwined" (Zakariya 2017: 10), Zakariya

demonstrates a persistent tendency within science toward what he calls the "eruption of mythic status," even while science understands and presents itself as undercutting the grounds upon which myth stands. This creates a critical conceptual tension in Zakariya's work, one shared with this project as well: myth concerns ultimate ends while epic concerns origins, yet scientific epics merge both into universal narratives of space and time. Zakariya spends some time uncovering how scientists did not adopt myth uncritically but were acutely aware of the paradoxes inherent in their projects; their totalizing ambitions forced them to question the very axioms upon which their frameworks were constructed, ultimately bringing them back to critiques of reason itself.

This paradox can be viewed through the lens of Adorno and Horkheimer's *Dialectic of Enlightenment* (1947), which critiques scientific rationality's reversion to myth. Their chapter on the "culture industry" extends this to popular media, portraying it as a mechanism of mass deception that commodifies culture, standardizes thought, and enforces conformity under capitalism, turning enlightenment into ideological domination. Zakariya echoes this entanglement in scientific epics, particularly in Chapter 10's analysis of Carl Sagan's *Cosmos*, which, as Zakariya claims, merges mythic ends and epic origins into a totalizing cosmic narrative, disseminated to mass audiences. Here, the critical tension intensifies: does popular science like *Cosmos* subvert or exemplify the logic of the culture industry? On the exemplifying side, *Cosmos* operates as a standardized media product, leveraging Sagan's celebrity persona, a kind of commodified "idol" in Adorno and Horkheimer's terms, to package complex cosmology into entertaining, consumable episodes that may reinforce passive spectatorship and illusory individuality, much as mass culture insulates viewers from societal contradictions. Conversely, Zakariya highlights Sagan's acute self-awareness of paradoxes, in which the series questions scientific axioms and critiques reason itself, inviting viewers to engage critically with universal histories, subverting domination by fostering

emancipatory reflection amid the mythic eruptions. Reflexively, this duality underscores that scientific epics in popular form do not merely narrate space-time totality but culturally mediate it, risking ideological reinforcement while harbouring disruptive potential; empirical trends in science communication today, where commodified formats dominate yet spark occasional public discourse, affirm this unresolved tension without tipping the scale definitively.

Zakariya's treatment of the sociology of scientific synthesis is particularly illuminating. He highlights persistent anxieties about expertise: who had the authority to undertake such syntheses, and the paradox that, despite their democratizing impulses, these projects construct a particular kind of elite to carry out that democratization. This concern with intellectual authority aligns with Eric Chaisson's characterization of the book as a history of "lumpers" versus "splitters", in other words, generalist scholars who seek to unify science amid increasingly specialized research communities. Zakariya demonstrates how, while authors of scientific epics sought to transcend the perspectives of their own eras, they remained embedded in the political and social struggles of their times, struggles to which the epics themselves respond. This embeddedness is exemplified in Zakariya's chapters on nuclear history, political cosmology, and the cultural work performed by the television series *Cosmos* and the work of Carl Sagan.

Zakariya's framework offers powerful analytical tools as a work of rhetoric and the history of science. His concept of genres of synthesis provides a historically grounded taxonomy for understanding how scientific narratives function rhetorically and epistemologically, while his attention to the mythic dimensions of scientific popularization resonates with critiques offered by scholars like Lisa H. Sideris. However, one limitation worth noting is that Zakariya's attempts to address the problem of whether physical, biological, and cultural history can be connected in a meaningful way are primarily historical

descriptions rather than cultural assessments of the here and now. Nevertheless, this work is vital to us as an essential contribution to examining the intersection of scientific knowledge, narrative structure, and the persistence of quasi-religious meaning-making within ostensibly secular discourse, from the perspectives of the history of science communication and rhetorical studies, two entwined elements of this project.

As a complementary work, Zakariya's analysis of Sagan's *Cosmos* (1980) and the inclusion of Tyson reveal how the television series functioned as the paradigmatic instantiation of what Zakariya terms "epic myth"—the fusing of origins and ends. By the late 1970s, prominent scientists were paying attention to and advancing the idea that a new totalizing myth was at hand, likely influenced by the rise of theories of the secular and secularization that were emerging in the post-war era. However, what constituted such a myth and what it might signify remained uncertain. Sagan, Wilson, and Weinberg all claimed that the scientific account was greater than those that preceded or contended with it, yet their understandings of myth were not uniform. Sagan and Wilson, Zakariya claims, explicitly drew on a cluster of theorists, such as Lévi-Strauss, Jung, and Freud, and endorsed a view that a profound and universal story was at stake in their work, a view that was notable in many of Sagan's public appearances. Zakariya draws on Northrop Frye's literary typology to demonstrate that *Cosmos* operates according to what Frye called romantic conventions: the just-below-the-mythic domain is the romantic, where the heroes are lordly humans, above their social world and in special communion with the natural world. The scientist-narrator, Zakariya, argues with regard to Sagan, is a "mythic epic hero" whose power derives from the ability to articulate the story of everything, a story that paradoxically claims transcendence while being self-consciously authored by the very humanity whose meaning it purports to establish, speaking to humanity and for the good of humanity (2017: 332).

I read this section of Zakariya's work as problematic as Sagan would, I think, be rather disturbed to be considered the hero in *Cosmos.* As the carefully selected title of *Cosmos* reveals, Sagan is our guide for the right now, and as the empty seat on board SotI suggests, there is someone else for the not yet of tomorrow. I also have an issue with Zakariya's framing of Sagan's work as an epic myth, because it limits the work *Cosmos* does beyond the origins-and-ends polemic. While Sagan's celebrity status was indeed cultivated through his media appearances and the massive viewership of *Cosmos* and undoubtedly invites mythic interpretations, as evidenced by contemporary portrayals of him as a "Showman of Science," this does not inherently validate Zakariya's epic framing as the primary lens, given Sagan's own emphasis on demystifying science for present-day applications. Instead, such readings risk overshadowing the series' core focus on contemporary issues, as my dissertation has shown that the "here and now" is more relevant than mythic abstraction. *Cosmos* is about the present. In fact, it is *mostly* about the here-and-now.

What makes Zakariya's analysis particularly valuable for work on the Grand Cosmic Narrative is his identification of the structural paradox at its core: the heroes of the universal story are the authors at work writing it, both because their own emergence is represented as a pivotal event in that universal tale and because of the power that they represent themselves as having in authoring and relating it. This entanglement of author and hero generates what Zakariya identifies as the fundamental aporia of secular scientific myth. Drawing on Frye's mirror-window metaphor, where the window shows "the vision of an indifferent nature that got along for untold aeons of time without us," while the mirror "fills us with the sense that the world exists primarily in reference to us" (1980: 6), Zakariya shows how the scientific epic oscillates between these poles but without resolution. The secular grammar demands that humanity knows it writes its own myths, yet the mythic form requires transcendence. The

narrative must be both historically and metaphysically adequate to the contemporary scientific and social world while acknowledging that it might forever be inadequate to either. This produces what Zakariya calls the "self-consciousness of authorship" that influenced E.O. Wilson's Epic of Evolution (2017: 338). Science proves older cosmologies false if read historically, yet, as science slides towards myth, the narrative must be transcendental. Science is "participating in a realm of truth that might lie beyond the human"—even though human authorship is constantly emphasized (Zakariya 2017: 336). While Zakariya doesn't engage with religion much, there is a suggestion that the scientific epic marks an attempt to construct a secular myth that performs the cultural work of religion while remaining formally committed to the provisionality and self-critique that define scientific epistemology. My work explicitly draws this out.

Zakariya's work is a rich complement that helps illuminate the Grand Cosmic Narrative in more depth. While not going as far as I have in claiming that the narrative type needs a new classification, nor in the claim about the religious dimensions at stake, Zakariya nonetheless has contributed to a growing interest in the narratives of science as being capable of offering more than facts, figures, and ways of looking at the world. What differentiates our work, aside from the descriptive claim on a distinct genre, is that my work aims to illuminate the socio-cultural mechanisms at work in the construction of grand narratives of science, and how the GCN could come into being. While Zakariya's is descriptive of the text itself, my work is descriptive of the text's operation in the broader cultural context. The cultural and sociological implications of the GCN motivate this work, and the history and philosophy of narratives of science detail it. As such, Zakariya's work is an essential contribution to understanding the meaning of a narrative such as the GCN, which we shall return to one last time.

A Grand Cosmic Narrative for a Secular Age: At the Crossroads of Science and Religion

John Hedley Brooke and Ronald Numbers told us that the points of contact between science and religion are complex: any view of them must be done so with reflexivity and context at the forefront. I have tried to do this throughout this work. “Religion” and “science” are notoriously hard to conceptualize, as they are ever-changing enterprises that Peter Harrison revealed to differ in meaning and definition across times and cultures (2015). This presents a challenge, one that you may have noticed along our way to this ending: I have not contended with “science” or “religion” in any conceptual capacity. The reason for this is simple, and it echoes the work done in Chapter One. Science and religion, for the purposes presented in this work, are socially mediated and culturally articulated concepts—they should not be essentialized. As Donovan Schaefer argued, which we discussed in Chapter Four, science *and* religion are concepts that are embodied—they have an affect—and they operate in the world with all that this entails.

Science is not a domain of value-free ideals, nor is religion housed within the private. The theoretical work that scholarship has produced on these two topics, through cultural, historical, and philosophical analysis over the past fifty years, has proved seemingly for naught. We are at a moment in the North Atlantic world where we seem to be bound to the oscillating swing of what could be viewed as the tilts of science, religion, science, religion, and it appears that the conditions of the present lend credibility to the fact that we are on the religion end of that swing. Take, for example, the rise of Christian Nationalism in the United States, which is spreading across the North Atlantic world. Douglas Wilson, an American pastor and theologian of growing fame and power in the United States, is close with Pete Hegseth, the US Secretary of War, and has been present at, and has led prayers at, GOP events under the late Charlie Kirk’s (1993-2025) leadership. His church, the Communion of Reformed Evangelical Churches (CREC), has over 160 chapters, mainly across the United

States, but also in Canada, Australia, Poland, the Ukraine, and elsewhere. Wilson's 2025 book, *Frequently Shouted Questions About Christian Nationalism*, does an admirable job of appearing welcoming and sensible, but nonetheless espouses a hope for an America that will soon be a Christian theocracy, where Christ is recognized as the ruling authority, giving divine guidance to human intermediaries, with executive, legislative, and judicial power managing the government's daily affairs.

It is not a stretch to say that such a system of government would undermine the scientific enterprise and would be directly counter to the simple set of rules that *Cosmos* espoused. The Canadian novelist and journalist Stephen Marche's 2022 book, *The Next Civil War: Dispatches from the American Future*, was, in part, motivated by the 06 January 2021 attack on Washington, DC, by supporters of Donald Trump. But it also reveals, through interviews across the United States, the conditions that contributed to the US reaching its current state in late 2025. Marche presents a compelling case on how the views that allowed for the attack, Christian Nationalism, and the general pervasive onslaught of self-destructive behaviour that has dominated the United States news for the duration of President Trump's second Presidential term, became so popular. As Marche writes, "Once partisan drive takes precedence over the national interest, it shreds the tension underlying the system. Unless both sides believe that they're on the same side, they aren't. And once shared purpose disappears, it's gone." (2022: 102). This points to a political tension that has run throughout this dissertation, one just under the surface, scratching to break free from under the page: the polarized landscape of contemporary politics.

The Grand Cosmic Narrative fails in such a world, or, more precisely, it fails to achieve at the macro-sociological level what its creators ideally hoped it might. We must be careful about what is meant by 'failure,' because the story I have been telling is more complex than a single sentence can convey. Throughout this dissertation, I have documented

the GCN's remarkable cultural reach: its cumulative viewership in the hundreds of millions, its persistent presence in popular culture, its elevation of Sagan and Tyson to the status of widely recognized public intellectuals. These claims are real and defensible. Yet the conflict thesis persists, and indeed, as my analysis of the contemporary landscape has shown, it has arguably intensified in the era of political polarization. How do we reconcile these apparently contradictory observations? The resolution may lie in distinguishing between cultural recognition and worldview displacement. The GCN has achieved the former without fully accomplishing the latter. *Cosmos* is famous; Sagan is a household name; the Pale Blue Dot is a shared cultural reference point. But cultural recognition and worldview formation operate on fundamentally different registers. A television programme can be widely known, even beloved, without overturning a framework—here the conflict thesis—that is sustained by institutional forces, political incentives, and a century and a half of popular historiography. Moreover, the GCN's deepest influence appears to operate among a specific demographic: the growing population of individuals who identify as spiritual but not religious. For this audience already predisposed to integrative frameworks, already seeking alternatives to both institutional religion and militant secularism, the GCN functions as a genuinely resonant meaning-making resource. But the conflict thesis persists most powerfully among a different demographic altogether, one shaped by the accelerating political polarization that has weaponized science-religion tensions for partisan ends. The GCN was not designed to reach this audience, and the political environment of the twenty-first century has created headwinds that no science programme could reasonably be expected to overcome. Finally, I must situate this analysis within Charles Taylor's account of the nova effect: the proliferation of meaning-options that characterizes the secular age—what Watts and Wilkins-Laflamme (2026) call late-stage secularization, the condition in which spiritual seeking has detached from institutional religion without thereby ceasing to be spiritual. The GCN is one such option, and

a powerful and culturally significant one, but it exists alongside many others, none of which has the capacity to displace structural conditions at the macro level. The GCN's 'failure,' then, is not a failure of the narrative itself but a reflection of the conditions under which any meaning-making project must now operate.

This concession raises an important question that has been running throughout this dissertation: if the GCN is as culturally embedded as I have argued—a fixture of the cultural lexicon, a programme that has reached millions—why has it not displaced the conflict thesis in popular discourse? The answer, I suggest, lies in a distinction between cultural recognition and worldview formation. *Cosmos* is culturally pervasive as a textual artifact for its imagery, language, and protagonists, as I have explained, are widely known. This recognition does not, however, translate into the displacement of a powerful narrative framework that has been institutionally sustained for over a century and that is, as the sociological data documented in Chapter Two confirms, structurally reinforced by political polarization. The GCN's influence operates at a different register: it is most legible among those already positioned to receive it. This is why the SBNR population, whose meaning-making needs it directly addresses, rather than among the broader public for whom the conflict thesis functions as a default cognitive shortcut, is such a critical group. The persistence of the conflict thesis and the cultural influence of the GCN are not contradictory claims but descriptions of different populations, different registers of influence, and different relationships to the conditions of belief that Taylor documented. My aim in adopting sociological data, declining rates of religiosity, growing rates of SBNR identification, and the number of social media exchanges is to pad the landing of this "not-yet" narrative register that has been growing since 1980. The strong political polarization publicly maintained in popular discourse on science and religion is a relevant factor in the resistance to the GCN as an accepted register of commitment, one that itself reflects the complexity I have detailed throughout this dissertation.

I argue that the complexity of the science-religion interface reflects the polarization of the political landscape we are witnessing in 2025. If we are to fully embrace the principle of complexity, we must contend with the fact that it is loaded in favour of certain forms of interaction at specific times. By forms, I refer back to the typologies that Barbour detailed in 1966: conflict, independence, dialogue, and integration, which together form a matrix. These typologies have mostly gone out of fashion and are spoken about in passing. But they ought to be what comes to mind when we think of Complexity. At the macro-sociological level, it is not unfair to say that the interaction between science and religion, as of November 2025, leans heavily towards conflict. This acknowledgment may appear to be at odds with the claims I have made throughout this dissertation about the GCN's cultural reach and significance, so I want to confront that tension directly rather than leave it implicit. I hoped to have made clear by now that the GCN has achieved remarkable cultural penetration, yet the conflict thesis nonetheless persists, and has in certain respects intensified. These claims are not contradictory once it is recognized that cultural recognition and worldview displacement are different phenomena operating at different scales. The GCN is culturally pervasive in that it is widely known and frequently referenced; the conflict thesis is structurally dominant in that it shapes institutional, political, and popular framings of the science-religion relationship. A television programme, even an extraordinarily successful one, operates at a different level of cultural force than the political and institutional dynamics that sustain the conflict thesis.

To analyze science–religion interactions with greater precision than typological labels allow, I here introduce a conceptual instrument for the Complexity Principle of Science and Religion (Table 1). The familiar Barbourian typologies of conflict, independence, dialogue, and integration are here preserved for analytic simplicity in representation, but are no longer treated as discrete, mutually exclusive boxes. Instead, they function as regions within a continuous two-dimensional space defined by the intersection of two analytic axes. This

approach makes it possible to locate individual cases—texts, public controversies, institutional statements, educational programmes, media artifacts, whatever—within a field of varying epistemic and practical entanglement, rather than presuming their position in advance.

On the horizontal axis of this matrix, I designate epistemic proximity. It measures the degree to which scientific and religious claims are represented as sharing, negotiating, or merging their underlying epistemic commitments. These include their methods of inquiry, standards of evidence, boundary-drawing practices, and ontological assumptions about the nature of reality. To operationalize this dimension, I evaluate four indicators on a scale of 0 to 4. The first indicator is methodological overlap: whether the actors portray the methods of science and religion as fundamentally incompatible, loosely analogous, or explicitly harmonizable. The second is evidentiary compatibility: whether similar types of evidence are treated as legitimate across domains, or whether each domain rejects the evidentiary practices of the other. The third is boundary discourse, which draws attention to how forcefully a case polices the division between science and religion or, conversely, reframes boundaries to permit cooperation or mutual illumination. The fourth indicator concerns ontological commitments. Here, the question is whether the ontologies presupposed or articulated in the discourse—materialism, theism, divine action, natural law, teleology—are portrayed as irreconcilable or are woven together into a coherent metaphysical account. The epistemic proximity score for a given case is the mean value of these four judgments.

I have designated the vertical axis as functional engagement. It captures the degree to which science and religion actually engage one another within the context being analyzed. This dimension concerns practices rather than presuppositions: how much these domains talk to one another, interpret one another, institutionally cooperate, or influence concrete action. Again, the four indicators are scored from 0 to 4. The first is direct engagement: whether

science and religion explicitly address each other's claims or remain silent and unaware of one another. The second is interpretative cross-referencing: whether scientific ideas are used to interpret or revise religious claims, or whether religious commitments shape the reception, meaning, or ethical framing of scientific ideas. The third indicator is institutional exchange, which includes joint committees, collaborative publications, cross-domain educational efforts, or coordinated public statements. The fourth concerns pragmatic entanglement: whether scientific and religious discourses jointly inform practical matters such as public policy, bioethics, education, pastoral guidance, and so on. The functional interaction score is the mean of these four indicators.

Plotting a case within this two-dimensional space makes the canonical categories empirically tractable. Conflict refers to cases in which epistemic proximity is high but functional engagement is low: science and religion are portrayed as epistemically incompatible yet remain locked in direct opposition. Independence characterizes cases in which both proximity and interaction are low: the domains are depicted as addressing distinct questions, employing different methods, and requiring no mutual engagement. Dialogue captures situations in which proximity is moderate, and interaction is moderate to high: the two domains are distinct yet capable of constructive engagement, often on philosophical, ethical, or methodological grounds. Integration occurs where both proximity and interaction are high: scientific and religious ideas are drawn together into shared explanatory or interpretive frameworks that yield unified cosmological, anthropological, or ethical visions.

This matrix is not intended as a rigid classification system, but as a coding scheme that makes explicit the interpretive decisions involved in characterizing any science–religion relationship. Rather than forcing cases into predetermined bins, it reveals gradations, hybrid configurations, and transitional forms—it reveals the complexity. A discourse may cluster near the border of dialogue and integration, or move from independence to dialogue over

time, or exhibit conflict at the level of epistemic claims while maintaining pragmatic cooperation in practice. A researcher may take this up and find that multiple engagements in their research each map differently; the resulting plotting would itself reveal an interesting mapping of the engagements. The Complexity Principle of Science and Religion thus provides a flexible analytic structure capable of accommodating the historical and cultural variability and rhetorical nuance that characterize science–religion relations in modern cultures.

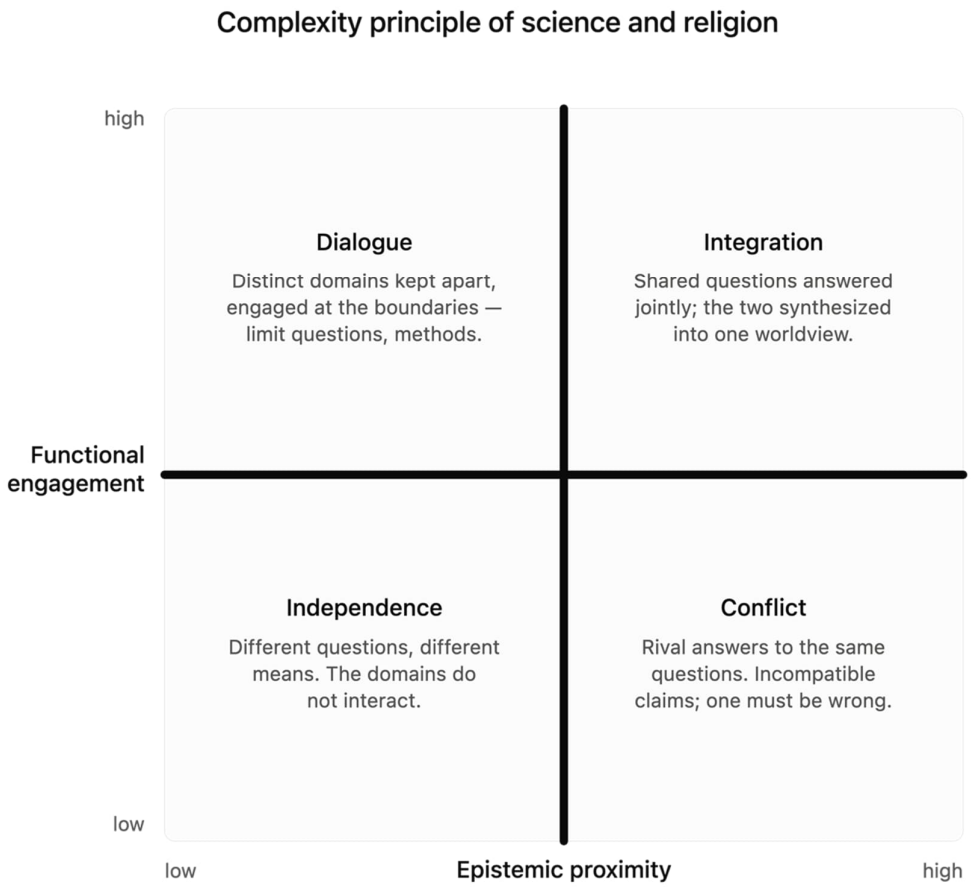


Table 1

Using this matrix to analyze the contemporary political landscape of the United States is a project that cannot be completed at the end of this dissertation, but it nonetheless demands our attention. The overlap between science and religion and the polarized political landscape of the United States is ripe for investigation by scholars of science and religion studies. Sociological research shows that political ideology is directly linked to religiosity in the United States and to attitudes toward science, and that political ideology is a "master identity" marker (O'Brien and Noy 2020; Kunovich 2025). Additionally, longitudinal research indicates a widening gap in confidence in science between liberals and conservatives (Gauchat 2012; Kozlowski 2022; Kunovich 2025).

This trend bears directly on the GCN's capacity to serve as a mediating framework. If confidence in science itself has become politically coded, then the GCN, which presupposes a baseline respect for scientific authority, faces structural limitations that are external to its own narrative strategies. This widening gap functions as an intervening variable: the political polarization of attitudes towards science creates conditions under which the conflict thesis is not merely inherited but actively reinforced, regardless of the GCN's cultural reach. Furthermore, people tend to disregard information that contradicts their partisan or ideological identity, rejecting scientific facts that conflict with a political ideology that explicitly rejects scientific claims (Rekker 2021). If partisan identity filters the reception of scientific claims, then the GCN's message will be received differently across the political spectrum and embraced by those whose identity is compatible with its integrative vision, and ignored or rejected by those for whom science itself has become a marker of political allegiance. This is a structural limitation, but not a failure of narrative craft.

These troubling findings attest to a long-standing issue in science communication, one that leans more toward conflict than toward complexity. To be clear, I am not making the claim that the Christian religion in the United States is in conflict with science and the ideals

of progressive, liberal values. This is evident from the many practicing scientists and leaders in the US who are Christian, such as Francis Collins, the Templeton Prize-winning scientist who led the Human Genome Project and served as Director of the National Institutes of Health. But I do claim that the character and pervasive nature of specific Protestant denominations in the United States, in conjunction with the broader political landscape, warrant concern in any discussion in the field of science and religion. That the history of science communication includes moments of agnostic and aesthetic leanings is a reminder of the swinging pendulum, but it is also a reminder that perhaps there is a middle ground that can bring the contact points closer together, rebalancing the matrix towards the centre. Whether the GCN could serve such a mediating function is a question that the cultural analysis offered here can pose but not definitively answer; it would require the kind of empirical reception studies I outline in the final section of this chapter. However, what this dissertation has demonstrated is that the GCN represents a culturally significant attempt to construct a meaning-making framework that transcends the conflict thesis, an attempt whose reach and persistence make it worthy of serious scholarly attention. Whether that attempt has succeeded in changing minds, and among which audiences, are empirical questions that lie beyond the scope of cultural and textual analysis and that point towards productive avenues for future research.

As I have striven to make clear, the Grand Cosmic Narrative as seen in *Cosmos* blends science and religion by grounding itself in the material world while reaching out to the transcendental. Using the table above, it becomes clear that the GCN, as portrayed in *Cosmos*, is precisely complex, fitting nowhere and everywhere when considered as a whole. Being difficult to locate in any single quadrant of the Complexity matrix, when considered as a whole, is a feature that reflects the GCN's genuinely complex engagement with multiple registers of the science-religion relationship, but which we must be careful not to present as a

virtue in itself. If the GCN is 'everywhere' in the matrix, the risk is that the analytical framework becomes unfalsifiable. More precisely, the GCN moves between positions on the Complexity matrix depending on the register of discourse: when Sagan warns against superstition, the GCN approaches conflict; when Cosmos evokes cosmic awe, it approaches integration; when it acknowledges the limits of scientific knowledge, it gestures towards dialogue. This movement is itself the phenomenon I have been analyzing.

Being everywhere and nowhere on the matrix is precisely what we would expect from something that engages so complexly with the affects of religion and the knowledge of science. This is, in Taylor's terms, the condition of the secular age made visible: not the absence of religion but the proliferation of options, including options that, like the GCN, occupy multiple typological positions simultaneously. Complexity is not only about reconciling with biases and holding judgments until all the evidence has been compiled and thought through; it is also about engaging in different ways of engagement and entanglement within the science-religion typologies. For example, as I said before, in Ep. 2 of both Cosmos APV and ASO, it is most situated within the Conflict zone of the matrix; this could also be said, to some extent, for Ep. 7 of APV. These episodes clearly make claims that are functionally and epistemically at odds with the doctrine of, say, Genesis. Yet, in Ep. 13 of both APV and ASO, there are clear signs of what I argue are Integration, and in Ep. 1 of both, there is a lean into Independence.

Each episode of *Cosmos* occupies one or more of the Barbourian typologies, which, as I argued, together form a matrix that *is* Complexity. That no single episode of *Cosmos* can be clearly identified as representative of the kind of engagement science and religion have throughout the series is critical. The complexity of the science and religion debate is expressed plainly by such texts of media, and is, I submit, precisely why the texts of contemporary popular culture are critical sources for scholarship in science and religion

studies. Not only do they offer a broad range of engagements at the intersection of these two enterprises, but they also offer a glimpse into the popular mind, informing the media of the public consciousness and informing back in a hermeneutic-like circle of interpretation, creation, interpretation, so on (Gadamer 2013). This alone is critical, as it provides a "temperature" for how the public views the interactions between science and religion. But furthermore, the texts of popular culture give vivid definition to the Complexity Principle itself; they are as varied as the Complexity Principle allows and, as I claimed, a source of rich exploration for scholars of science and religion.

In the case of the GCN, as I have detailed throughout this dissertation and as expressed in *Cosmos*, it consistently frames the Cosmos as dynamic and mutable and positions this ontological claim as carrying ethical implications: that human beings, too, should cultivate reflexivity and adaptability. The GCN's rhetorical strategy here is to derive normative orientation from descriptive cosmology, a move that, as Hume's (1739) fact-value distinction reminds us, cannot be logically entailed from empirical premises alone. The philosophical seriousness of this problem warrants direct engagement. The GCN does not attempt to deduce ethical conclusions from cosmological facts; to do so would be to commit a naturalistic fallacy that philosophers, like Hume, identified. The GCN's strategy is better understood as narrative mediation: through the affective and aesthetic strategies analyzed in the preceding chapters—the cultivation of wonder, the deployment of enchantment in its several registers, the investment of scientific disclosure with existential weight—the *Cosmos* series creates conditions in which certain normative orientations become experientially compelling without being logically entailed. This is not a resolution of the is/ought problem but a different mode of operation. As Martha Nussbaum (1990) has argued in her account of the relationship between literature and moral philosophy, narrative can cultivate moral perception and attunement in ways that deductive argument cannot, because it engages

faculties such as imagination, empathy, and affective responsiveness that are constitutive of practical reason. The GCN operates in an analogous register. It does not argue that because we are made of starstuff we therefore ought to care for one another, but rather creates the narrative and affective conditions in which cosmic kinship is felt as carrying moral weight. Whether this constitutes a legitimate form of moral knowledge or merely effective persuasion is a question this dissertation has identified but cannot resolve. The series achieves this through the affective and narrative strategies analyzed in the preceding chapters, creating what amounts to a secular exhortation to inquiry and resilience, grounded in the authority of the scientific worldview. The GCN encourages facing change head-on, to embrace it, and to recognize it as part of the processes of the Cosmos; to do so with the mind of inquiry that has allowed the processes of science to emerge as a powerful epistemic enterprise, meaning not just accepting change blindly, but questioning it and arriving at an answer guided by the simple rules presented in *Cosmos.*

Perhaps it is fair to say that, as an analogous programme, the Grand Cosmic Narrative is a material, secular counterpart of Process Theology, especially that of Pierre Teilhard de Chardin (1881-1955) and John F Haught (1942-). Pierre Teilhard de Chardin's evolutionary cosmology and John F Haught's theological appropriation of it represent a trajectory within process-oriented Christian thought that diverges significantly from classical Whiteheadian process theology, yet shares its commitment to integrating evolutionary science with theistic metaphysics. Teilhard, whose posthumously published *The Phenomenon of Man* (1955) synthesized paleontology with mystical Christianity, proposed a teleological vision of cosmic evolution driven toward increasing complexity-consciousness and ultimately converging at the "Omega Point" (259)—a transcendent yet immanent Christ who both attracts creation forward and represents its eschatological consummation. Haught, building on Teilhard while engaging Whiteheadian metaphysics and contemporary evolutionary biology, argues in works

like *God After Darwin* (2000) and *The New Cosmic Story* (2017) that divine action operates not through interventionist causation but through what he terms "metaphysical persuasion" and a "universe in becoming" or "not yet"—God as the future luring creation toward greater complexity, beauty, and novelty, thus making the randomness and suffering inherent in natural selection theodically intelligible as necessary conditions for genuine creativity and freedom. Both thinkers prioritize becoming over being, futurity over past determination, and cosmic evolution as inherently christological. Process Theology, therefore, is a response to the changing nature of the Cosmos, to a world in motion.

My claim of similarity does two interrelated things here. The first is that it makes a claim that brings Complexity into even sharper focus. I have already discussed Complexity in this chapter, but here I want to draw on the two points I am making together, because each supports the overall claim. The Complexity of the GCN in relation to Process Theology reveals the shared value of an ethical stance towards the world as changing, ever in motion, never static nor completely knowable. It therefore asks us to be vigilant in our pursuit of knowing it, as a better understanding translates into a deeper appreciation. This plays directly into complexity, and using our matrix from above, we can place the Grand Cosmic Narrative, in relation to process theology, reoccupying the metaphysical space it and others have had, as somewhere close to the dead-centre of the Complexity matrix. As I have shown throughout this work, *Cosmos* has moments of conflict, moments of dialogue, moments of integration using the framework of reoccupation, and moments of independence. Therefore, *Cosmos* and the GCN represent a critical site for discussions on science and religion. This is precisely what I named in Chapter Two as the GCN's secular-transcendent quality, now redescribed with the analytic resources that the subsequent chapters made available: transcendence as the convergence of three registers of enchantment within a narrative of wholly naturalistic content.

The second is that the structural parallel between the GCN and Process Theology illuminates the GCN's relationship not only to the tradition of science popularization detailed in Chapter Two, but also to the broader theological landscape. Process theology, in response to the ever-changing state of knowledge revealed by science, shows how a Cosmos coming into being is connected to a secular worldview of a universe and a society coming into being, ever moving and never completely knowable. Process Theology's insistence that creation is perpetually in process, that the future is genuinely open, and that conscious beings participate in shaping what the Cosmos becomes finds a structural echo in the GCN's framing of human agency within a dynamic, unfinished universe. This structural parallel demonstrates how complexity and the reoccupation of grand narrative structures, the theistic narrative structures of the past, are at work in forming meaning-making today through the processes I have detailed in this work.

This tells us that the Grand Cosmic Narrative operates through various structures borrowed from religious traditions: it situates the individual within a larger story of cosmic significance, cultivates particular affective dispositions toward the natural world—what I have analyzed throughout this dissertation as the three registers of enchantment, each producing a distinct mode of affective orientation—and, perhaps most importantly, discloses not merely what is the case but how one ought to relate to and act within the world. This final characteristic, the conversion of enchantment into meaning, of affective response into durable existential orientation, deserves sustained attention here. It suggests that the GCN functions as a reoccupation of multiple theological traditions, further cementing its complexity. As I have shown throughout, the narrative conveys not only factual claims about cosmic history but also normative truths about human existence, which raises the questions of what kind of knowledge this constitutes and what authorizes it.

Theologians have long distinguished between natural theology, the attempt to derive knowledge of God through reason and observation of the world as created order, and revealed theology, which concerns truths disclosed through divine self-communication. Revealed knowledge, in this framework, is characterized not only by its source but also by its content: it addresses matters inaccessible to unaided inquiry, including how one ought to live, what postures of reverence or gratitude are fitting, and how the human being stands in relation to ultimate reality. These are the metaphysical questions that Hans Blumenberg was concerned with and the changing nature of the positions that answer them. In Blumenberg's framework, what is decisive is that the position, the structural demand for existentially orienting knowledge disclosed to human beings rather than constructed by them, persists even when the agent of disclosure shifts from God to the Cosmos as interpreted through scientific inquiry. Reoccupation, here, means that the structural position of revelation endures while its theological content is replaced by naturalistic content; the position is retained, but the occupant is transformed. What is striking about the Grand Cosmic Narrative is that what I have delivered here suggests precisely this kind of existentially orienting knowledge while ostensibly remaining within the bounds of empirical science. The Cosmos, narrated in the framing revealed in *Cosmos*, is said to indicate our kinship with all life, our responsibilities as conscious beings aware of our own emergence, and the appropriate stance towards the future of all before the universe's immensity and improbability.

At the descriptive level, the GCN reoccupies the structural position of revealed theology: it treats the scientific narrative as an authoritative source of normative orientation, much as religious traditions treat their revelatory texts and traditions, while the content that fills this position is wholly naturalistic—derived from empirical inquiry rather than from divine self-communication. In this framework, the science communicator, here Carl Sagan and Neil deGrasse Tyson, occupies a role structurally analogous to that of the prophet or

interpreter, which is even exemplified by their choice of attire in each series. They not only convey information, but they render it meaningful, translating cosmic facts into existential imperatives. This functional analysis does not require adjudicating whether the Cosmos genuinely reveals normative truths; it merely notes that the GCN operates as if it does, and that this operation depends on narrative strategies, affective cultivation, and charismatic authority rather than on logical entailment from scientific premises to ethical conclusions. That *Cosmos* has become so popular, so culturally embedded within the lexicon of our society, does not in itself provide evidence for the normative claims it espouses; to argue otherwise would be to commit the argumentum *ad populum*. Popularity tells us that the narrative resonates, not that it is correct. What the GCN's cultural reach demonstrates, however, is that there is a substantial audience for whom the integration of scientific knowledge with questions of meaning, purpose, and even the sacred is not merely acceptable but actively sought. The GCN's popularity is evidence of a cultural appetite, and its presentation, which I have worked to reveal in depth throughout this dissertation, renders the GCN as having the longevity and continuance of a religious-like endeavour.

Indeed, we could press this even further. The persistent power of the Grand Cosmic Narrative—its capacity to move audiences toward what its proponents describe as more fitting relations with the natural world, exemplified by each series' unique concern with the Cold War or the Climate Crisis—raises the question of whether something more than rhetorical technique is at work. One need not commit to a full-fledged natural law metaphysics to wonder whether sustained, careful attention to the structure of the Cosmos might disclose something about how conscious beings ought to inhabit it. The affective responses cultivated by the narrative, the enchantment of the revealed, producing wonder and humility before the scale of what science discloses, enchantment of the narrative, producing a sense of belonging and responsibility through the investment of secular history with sacred

weight, may not be merely imposed upon neutral facts but may instead constitute a form of receptivity through which certain truths become available. This is not to claim that normative conclusions follow deductively from empirical premises; Hume's distinction between is and ought remains philosophically serious. It is rather to suggest that the relationship between descriptive and normative knowledge may resist the sharp dichotomy that Hume's distinction, in its strongest formulations, implies. Several philosophical traditions offer resources for thinking about this relationship with greater nuance than a binary permits. Iris Murdoch's (1970) moral philosophy, for instance, argues that careful, loving attention to reality is itself a moral act, and that the way one sees the world is inseparable from one's ethical orientation toward it. Similarly, the phenomenological tradition has maintained that perception is never value-neutral but always already structured by practical and affective orientations.[54] The Grand Cosmic Narrative, on the analysis offered here, may best be understood as cultivating this kind of attentive perception: it trains the viewer to see the Cosmos in a particular way—as interconnected, as generative, as ancient and vast—and this trained perception carries normative implications not through deductive entailment but through what we might call, following Charles Taylor (1989), a shift in one's "moral sources." This does not resolve the is/ought problem, and I would be irresponsible to claim otherwise. It does, however, suggest that the GCN's cultural effectiveness cannot be dismissed simply as a logical fallacy dressed in appealing aesthetics; it operates within a space between strict deduction and mere persuasion that moral philosophy is continually engaged with.

Here, at the final moments of this dissertation, there is no space to resolve these metaphysical questions, but it does not need to. What it can demonstrate is that the Grand Cosmic Narrative, in its actual cultural operation, has assumed the functions traditionally

[54] For example, see Maurice Merleau-Ponty's 1945 book *Phenomenology of Perception*.

performed by revealed theology: it claims to disclose truths about how to live, it cultivates the affective conditions necessary for receiving those truths, and it depends upon that revelation to instill a world-ethic to mediate between the Cosmos and its human inhabitants. Whether this constitutes genuine revelation, sophisticated rhetoric, or something that troubles the distinction between the two remains a question worthy of continued inquiry, which sits at the intersection of epistemology, theology, and the philosophy of science, and that the phenomenon of science communication renders freshly urgent within the field of science and religion studies. As such, the Complexity Principle is an apt tool for thinking about science and religion in relation to grand narratives of science, and it has been my task to reveal that this is the case for the Grand Cosmic Narrative.

Returning to the Shores of the Cosmic Ocean

When the final episode of both *A Personal Voyage* and *A Spacetime Odyssey* closes, Carl Sagan and Neil deGrasse Tyson return to the shore where the series began. In APV, Sagan holds a dandelion seed between his fingers, the camera tight on his face, the Pacific behind him, the Ship of the Imagination empty as it sails on through space without him. In ASO, Tyson delivers an impassioned speech that does not summarize what the show covered but rather conveys the narrative's affective tone and the hopes for humanity's future that the series expressed. The narrative of *Cosmos* sets out from this shore, and the narrative ends here. It is no accident that *Cosmos* chose to bookend itself with the same image; this is among the most considered narrative moves in the series. To return is not merely to repeat. To return is to gather what has been gained along the way, and to gather, the journey must be willing to acknowledge the threads it has carried with it. This dissertation, too, has been its own kind of personal voyage. Before pressing on into the questions that remain, and into the personal

reflections that close this work, I want to turn back to the inviting Shores of the Cosmic Ocean.

The first thread we picked up was the one I have been signalling across these chapters: that the conflict thesis has been displaced in scholarship and not in popular consciousness. Brooke (1991), Numbers (2009), and Harrison (2015) showed, more or less definitively, that the historical relationship between science and religion is far more textured than the conflict thesis allows. Ecklund's (2010, 2018, 2019, 2020) sociological work confirmed that this consensus is restricted largely to scholars, while the popular mind—particularly the American popular mind, but well beyond it—continues to receive the science–religion relationship through the lens that White and Draper provided over a century ago. Throughout this dissertation, I have argued that the Grand Cosmic Narrative operates according to a fundamentally different logic, and yet I have been careful to insist, again and again, that the cultural penetration of *Cosmos*—the programme viewed over a billion times, the names that have entered the household lexicon, the imagery that has become a shared cultural reference—has not dispelled the conflict framing from its place of persistent reference and structural dominance. My claim is that this is not a hedge but a finding. To collapse cultural recognition into worldview displacement would be to miss what is really happening. The GCN's cultural success and the persistence of the conflict thesis are not contradictions but co-constitutive features of what Taylor (2007) calls our "secular age," a condition in which the very same processes that produce mass-market spiritual narratives also produce the institutional and political incentives that sustain the conflict framework. The GCN circulates within those conditions, not above them.

The second thread, picked up in Chapter Two and threaded through every chapter since, was the demographic question—who, precisely, does the GCN reach? Ecklund's "spiritual entrepreneurs" gave us the answer in outline: a population of "spiritual but not

religious" individuals, including a non-trivial subset of practicing scientists, looking to "hold science and faith together yet still free of the constraints of traditional religion" (Ecklund 2010: 54). Watts and Wilkins-Laflamme's (2026) more recent characterization of contemporary spirituality as a religious formation organized around an experiential epistemology, an immanent ontology, and a soteriology of self-realization—what they term late-stage secularization—gave us the answer in precision; the alignment with the GCN's own framework is striking. The audience that the GCN speaks to most powerfully is, I have argued, precisely the constituency for whom the conflict thesis has already become illegible—those for whom institutional religion is no longer a live option but for whom the meaning-making, moral-orientation, and affective-attunement work of religious traditions has not therefore ceased to matter.

To call the GCN's success "partial" because it has not reached audiences shaped by conflict-thesis polarization would, I claim, be a category error. The GCN was never designed for that audience, and its mode of address is largely illegible to populations whose worldview formation is structured by the very framing the GCN is built to transcend. Within its audience, the GCN is precisely as successful as the cultural conditions permit. Beyond its audience, the relevant analytical question is not whether the GCN has "won" but why the macro-level structural conditions that produce the conflict thesis are so resistant to any counter-narrative. That is a question for empirical reception research, and I shall return to it in the following section. Here, I merely note that the GCN's sphere of influence is bounded, that the bounds are sociologically intelligible, and that the analytical task is to describe what the GCN does within those bounds rather than to lament what it does not do beyond them.

The third thread is the conceptual instrument I built across Chapters Three and Four: the taxonomy of enchantment in three registers. Where Weber (2004) collapsed enchantment into a single category and treated its disappearance as the master diagnosis of modernity, and

where Taylor (2007) reframed disenchantment as a transformation of the conditions of belief rather than a loss, I have argued that the affective work the GCN performs cannot be captured by a single concept. Enchantment of the unknown, the ambient experience of a Cosmos charged with meaning that is characteristic of the porous self, persists in the GCN as the inexhaustibility of the scientific frontier—mystery regenerating itself at the limit of every answered question; an ever-advancing horizon of mystery. Enchantment of the revealed, the awe generated when science discloses scales, structures, and connections that overwhelm ordinary comprehension, is the GCN's signature mode—the Cosmic Calendar compressing 13.8 billion years into a single year, the recognition that we are "starstuff," the stunning fact of stellar nucleosynthesis as the genealogy of our very existence. Enchantment of the narrative, the investment of secular history with the affective weight of sacred story, is the rhetorical layer that turns scientific facts into existential propositions—Sagan's Samos as a pilgrimage site, Newton's Christmas birth and Woolsthorpe home as secular shrine, Halley's prediction as a "prophecy" that science delivered where the mystics could not.

What the content analyses in Chapters Two through Five demonstrate is that the GCN's distinctive cultural work is the convergence of all three registers in a single narrative form. The "we are made of starstuff" claim is not enchantment of the revealed alone; it is, simultaneously, enchantment of the narrative—a secular Imago Dei—with mystery preserved at the horizon. This convergence is what differentiates the GCN from the Epic of Evolution, which mobilizes primarily enchantment of the revealed within an evolutionary frame, and from the Humanist Blockbuster, which mobilizes enchantment of the narrative within a frame of human exceptionalism. The Grand Cosmic Narrative's signature is the layering, not any single register on its own.

The fourth thread runs from Blumenberg's reoccupation through Keel's elaboration of it as cultural debt: that the structural positions where existential questions are addressed do

not vacate themselves merely because their theological occupants withdraw. They are instead filled with new content drawn from new sources. I have made the case across these chapters that the GCN reoccupies, within secular registers, several structural positions that the Abrahamic traditions, and Christianity in particular within the North Atlantic world, long held: the position of cosmogony (the Big Bang and the Cosmic Calendar in place of Genesis), the position of moral orientation ("we speak for Earth," the simple set of rules, the cosmic ethic), the position of communal belonging ("citizen of the Cosmos"), and the position of revelatory authority (the scientist-narrator as the figure who renders the cosmic story meaningful—what Olman (2013) named the scientific-prophetic ethos). To say that the GCN reoccupies these positions is not to say that it becomes a religion; the distinction between functional analogy and ontological identity, which I argued for in Chapter Three, holds throughout. It is to say that the demand for answers in these positions has not gone away, and that *Cosmos*—deliberately, knowingly, with a full sense of what it is doing—offers naturalistic content to fill the positions whose structural insistence outlasts the theological frameworks that once filled them.

The GCN's "cultural debt" to the traditions it succeeds, in Keel's (2018) sense, is not a flaw to be apologized for but the very feature that gives it its narrative force; it borrows the cadences, the rhythms, the architectural sensibilities of sacred story precisely because those cadences are how human beings have long been instructed to hear meaning. To strip the GCN of its theological resonances would be to strip it of the affective scaffolding that allows its scientific content to land as meaning rather than as information.

The fifth thread, noted in Chapter Three, delivered in Chapter Five, and returned to now, was the Pale Blue Dot itself. I want to return to it here because no synthesis of this dissertation's threads is complete without it. When Sagan asks NASA to swing the Voyager camera around for one last look home, and when the photograph that returns shows the Earth

as a “mote of dust suspended in a sunbeam,” every register of the GCN is operating at full intensity, as if all the dials were turned up to eleven. The mystery is not what we cannot see—we can see it, clearly enough; the dot in the sunbeam is uncontroversial. The mystery is what the disclosure invites: the recognition that “every saint and sinner in the history of our species lived there” (Sagan 1994: 6), that the political and ideological architectures we have built up are visible from six billion kilometres away only as the indistinguishable inhabitants of “one corner of this pixel.” This is enchantment of the revealed at its most concentrated.

The narrative framing that Sagan supplies—”the only home we’ve ever known,” “our responsibility to deal more kindly with one another”—is enchantment of the narrative at its most direct. And the mystery, preserved in the closing acknowledgment that “there is no hint that help will come from elsewhere to save us from ourselves,” is enchantment of the unknown rendered as a horizon of moral responsibility rather than as an animate Cosmos. The Pale Blue Dot is the GCN in miniature: scientific content rendered as existential proposition, scaled to the level at which conduct becomes intelligible, made meaningful through narrative framing that refuses both supernatural rescue and material despair. It is, I think, the clearest single demonstration of what this dissertation has been arguing all along: that science, taken seriously as both an epistemic enterprise and a source of meaning, can do the cultural work that has historically been the work of religious traditions, without becoming a religion in any institutional sense.

The sixth thread, woven less obviously than the others but unmistakably present, is the Cosmic Calendar. Through every chapter—from Chapter One’s introduction of it as Sagan’s most enduring metaphorical achievement, through the content analyses of every episode in which Sagan or Tyson steps onto the Calendar’s compressed twelve months and shrinks himself into its final fourteen seconds—the Calendar has served as the GCN’s signature mode of disclosure. It is what allows scientific time to become felt time. It is what

permits the disorientation of 13.8 billion years to crystallize into the recognition that all of recorded history occupies the last minute of the year. It is the device that converts the cosmic into the personal, and the personal into the ethical. Like the Pale Blue Dot, the Cosmic Calendar performs all three registers of enchantment simultaneously, and like the Pale Blue Dot, it does so not as a static piece of information but as an experience whose force depends on its multimodal staging—the music, the visual rendering, the host's stepping into the frame, the slow compression of unfathomable time into a single revolving year. It is no surprise that Cosmos's creators, in both 1980 and 2014, recognized the Cosmic Calendar as the keystone of the series' rhetorical architecture; without it, the GCN's scope would remain a recitation of facts, vast but unmoored. With the Cosmic Calendar, the GCN becomes a story that the viewer can walk into.

The seventh thread is the "simple set of rules"—the five precepts that Tyson articulates in the opening episode of A Spacetime Odyssey and revisits in the final episode of the series. Test ideas by experiment and observation. Build on those ideas that pass the test. Reject the ones that fail. Follow the evidence wherever it leads. Question everything. These rules look, at first, like a methodological credo, a thumbnail epistemology of science. But the GCN deploys them as something more simple and profound: a stance toward the world, an ethics of intellectual humility, a practice of standing in relation to truth rather than possessing it. They are not, on their own, sufficient to ground a moral framework; as I noted in the preceding section, the leap from descriptive cosmology to normative orientation cannot be made by deduction alone. What the rules do, however, is establish the posture of the inquirer—a posture of openness, of correction, of willingness to be wrong—that the GCN treats as itself a form of moral knowledge. To live by the rules is to live in a particular way: skeptical, curious, hopeful, willing to revise. This, I have argued, is not a religion. But it is, undeniably, an ethics of selfhood that performs the cultural work that religious traditions have

historically performed in offering models of how to live. The GCN's offer is that science, taken seriously as a way of thinking rather than as a body of claims, can be that model.

These seven threads—the persistence of the conflict thesis and the bounded reach of the GCN's reply; the SBNR audience and the macro/micro distinction that makes the reply intelligible; the three registers of enchantment and their convergence; the reoccupation of theological answer-positions by naturalistic content; the Pale Blue Dot as the GCN in miniature; the Cosmic Calendar as its keystone metaphor; and the simple set of rules as an ethics of inquiry—do not exhaust everything this dissertation has tried to argue. They do, however, locate the centre of its claim. The Grand Cosmic Narrative is not a triumphant displacement of religious cosmology, nor a covert reintroduction of religion under naturalistic cover, nor a mere science popularization dressed up with grandiose rhetoric. It is a distinct narrative genre, with a traceable genealogy, a specific audience, a characteristic rhetorical architecture, and an analyzable mode of cultural operation. It does what it does, it reaches whom it reaches, and it fails to do what it fails to do for reasons that the analytical apparatus I have built across these chapters can render explicit rather than mysterious. To call this a successful programme of cultural and intellectual work would be premature; reception studies of the kind I outline in the next section are still required before any such verdict could be defended. But to call it a programme worth taking seriously, I believe, is what the chapters of this dissertation have established, I hope, clearly. The Cosmic Shore that Sagan returns to at the end of A Personal Voyage, dandelion in hand, was never only a place to leave from. It was also a place to come back to, having gathered what the voyage made available, and done so in ASO by Tyson. We have arrived, for now, at our own shore. What remains is to look, with the cosmic perspective that the GCN itself recommends, at what comes next.

A View to the Horizon

Having worked through these chapters to set the Grand Cosmic Narrative up as a unique genre of grand science narrative, a question arises: Where does this get us? As scholars of science and narrative, the short answer is that we ought to formulate questions that test the Grand Cosmic Narrative as a text with meaning-making potential using qualitative and quantitative sociological data. There is room in the field of science and religion to better understand how those individuals who neither commit to religion nor have strong feelings about science view the claims of both. Would the Grand Cosmic Narrative appeal to them? What is the uptake of the framing of the narrative in *Cosmos*? There is also room in such studies to better understand how the colloquial usage of these terms, "science" and "religion", are deployed in political and cultural contexts. Specifically, it is important to better understand how these terms operate in worldview formation; the Grand Cosmic Narrative as revealed in *Cosmos: Possible Worlds* (2020) is well-suited to this task.

There is also the case of Carl Sagan as a cultural figure. In South America, especially Brazil, Carl Sagan is a widely popular figure on social media platforms like Instagram. A significant volume of social media engagement with the GCN occurs in Portuguese, a phenomenon that speaks to *Cosmos*'s reach beyond the Anglophone world and warrants further empirical investigation. This is especially interesting given its location, as Brazil is the last country with a Positivist Church inspired by one of the founding figures in philosophy of science, August Comte (1798-1857). There is also a flourishing research focus on science and religion in Brazil, with the organization ABC2 being a notable example. Making connections with scholars in this part of South America, who in turn would have connections with other scholars in the broader South American context, would help to illuminate the uptake of spiritual but not religious people who find their spiritual centre in the lessons of humility and intellect that stories of science, like the GCN, reveal.

But beyond South America, there is an opportunity to engage more globally on science and religion as sites of meaning-making. The applicability of the GCN outside the scope of the North Atlantic world is required to make sense of two critical questions: 1) Do science and religion have similar meaning-making patterns on representation in popular media texts in other parts of the world?; and 2) If so, would *Cosmos* appeal in the same way as it has in the North Atlantic world? This raises further questions that probe more deeply the entanglements of meaning, affect, and science in global contexts. For example, is the fact that science is framed as an epistemic culture for all seen this way around the globe, and not just by critics in science and technology studies within the North Atlantic world? Are the affective elements of *Cosmos* as effective in cultures outside the Christian tradition? What are the popular texts in other cultures around the globe that inspire meaning, and what are the epistemic cultures they portray? How do they compare to those in the North Atlantic world? And, do they "reoccupy" religion, or even science? These are but a small sampling of the questions that scholarship can focus on, broadening beyond the GCN to a global perspective.

One final area worth mentioning here, as it has been a subtle theme throughout this dissertation, is the political implications of the interactions between science and religion as they play out today, drawing on lessons from the past. Work by Peter Harrison, such as his very recent *Some New World: Myths of Supernatural Belief in a Secular Age* (2024), illuminates the historical mechanisms at play in the development of alternative belief structures in modernity, and my own work fits well with the growing body of scholarship in this area. However, my thesis is suggestive of a political dimension at play, and I think that has only grown more apparent over the course of the last decade or so, with the rise of, on the one hand, digital technologies like social media products, and on the other hand, the seemingly rapidly changing social and cultural environment enabled by these technologies. These two hands, note, are connected to one body, and it is my view that science and religion

act as the tissues of the arms connecting to the body; they function as deeply interconnected dimensions of human culture, distinct in their methods and epistemic commitments, but woven together in ways that resist the clean separations demanded by the conflict thesis. Regardless of where this work goes, the questions that arise within the field of science and religion are virtually endless and a rich source of inspiration.

Conclusion to a Conclusion

The Grand Cosmic Narrative is a unique genre of science popularization, an expression of the changing attitudes of meaning-making in a seemingly secular age, and a recontextualization or reoccupation of the Christian gospels, imagery, and themes, at least in the context of the North Atlantic world, for anyone who may be spiritual but not religious, or whatever else one may be. The thesis of this work has been that *Cosmos* is the prototypical example of the Grand Cosmic Narrative, the title I have given this new genre; a genre that, I have argued, is both of science and of religion. It is of science in its content—the empirical knowledge that produces enchantment of the revealed—and of religion in its operation—the narrative strategies that invest that knowledge with existential weight, producing enchantment of the narrative and sustaining mystery as an open horizon of inquiry. That the GCN is "both of science and of religion" is not a vague claim of overlap but a precise description of how distinct registers of enchantment, each with its own phenomenological profile and cultural genealogy, converge in a single narrative form to produce durable frameworks for meaning.

This is my critical contribution to the field of science and religion: these terms have far greater use-values than we typically grant them. By operating at the cultural register at which these terms function in public discourse, the very register where *Cosmos* itself operates, we are able to make claims about science and religion that span the centuries and disciplines present throughout this work. We move away from practice, theory, and

methodology, and the many important contributions that have been made in sociology, philosophy, and the history of science, and we allow ourselves to be open to the ways in which this term is deployed and operates in common parlance, the meanings attached, and the structural work that it does. The same is the case for "religion", where we are less concerned with specific denominations, value judgments, or practices and beliefs, all important, but look at religion as affectual and cultural.

This has allowed us to make claims about science and religion that span centuries and disciplines. As a work of social history and philosophy, this was especially important, as the object of our investigation was the *Cosmos* television series, which is, of course, a popular text of multimodal media. Being a multimodal media text was an essential component of my analysis, and it is not lost on me that the written word prohibits the very affectual engagement I wrote was so vital in Chapter Four. Regardless, the fact that science and religion operate within a media text like *Cosmos* reveals how they are connected more intimately and pervasively than some may think. Add to this the documented growth in non-institutional spirituality among younger demographics in the North Atlantic world—what Tara Isabella Burton (2020) has characterized as a turn toward "remixed" spiritual practices among those who have disaffiliated from organized religion—and we have a crucial opportunity to assess the drivers of this change amid weakening scientific and civic institutional structures, of which young people have historically been more supportive. Among the many factors complicating the secularization thesis, the delegitimizing critiques of science's authority that emerged from the Science Wars of the 1990s may have contributed to weakening one of the thesis's key assumptions—that scientific rationality would inevitably displace religious

belief.[55] This is certainly not the place to end this work, but it is a question worth assessing and an issue that will no doubt have a strong hold on our lives for the foreseeable future.

The story I have told here is still unfolding, and it is only a part of a whole. It has been my intention to shed a little light on something I have noticed in the world, something that has grabbed the attention of millions of people and garnered a response from tens of millions more. The precise scale of that attention, and more importantly, its depth, remains an empirical question that this cultural analysis can pose but not definitively answer. What this analysis has done, however, is to argue that science can be meaningful when taken not as claims, data, or knowledge, but as an approach to the world that asks us to listen, observe, be reflective, and think for ourselves. This was something the scholarship lacked, so it motivated me to pursue this work. The GCN frames science as purposeful when viewed as an enterprise of democratic engagement. It presents scientific inquiry not merely as a method for producing knowledge but as a practice of distinguishing truth claims from value claims, of deliberating across differences, and of arriving at provisional consensus through evidence and argument. This capacity to model democratic discourse through the authority of scientific method—rather than through moral prescription or political ideology—is the defining trait of the Grand Cosmic Narrative in contrast to other grand narratives of science. Science can be ethical when considering the principles espoused by that simple set of rules. Considering the moralizing interventions of young people and activists, it is fair to say that their concerns are genuinely inspired and morally defensible. It is the *right* feeling to be outraged at injustice; it is the *right* feeling to be motivated to help others. The issue arises, of course, in competing interests, whether that be morally, economically, politically, or otherwise. But if the tools available were those that allowed dialogue, distinguished between truth claims and value

[55] The rapid rise and success of STS as a discipline in academic circles may have played a crucial role in this.

claims, and enabled reaching some agreement between them, then perhaps we could work towards bridging the gap in the polemical culture we presently occupy. This is the defining trait of the Grand Cosmic Narrative in contrast to other grand narratives of science.

Personally, the works of Carl Sagan and those he inspired have greatly influenced me. They have made me slow down and assess my thoughts, my feelings, and what I think I know. The Grand Cosmic Narrative has not just been helpful to me as a source of inspiration and guidance, but also allowed me to connect with the world around me in a more meaningful and impactful way. By thinking of myself as a “citizen of the Cosmos”, as one small, tiny expression of matter with an impact on other expressions, I see each life, each object, as a unique expression of the Cosmos. If, at the beginning, there was dark and then the light of God, I have chosen to live in this deep cosmic ocean with science and the lessons of value it may allow for as my light, in the absence of God, in the long, endless enveloping dark of this Cosmos, ancient and vast. In this, I know I am not alone.

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